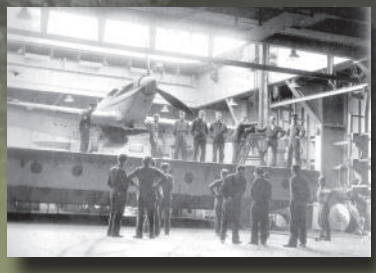
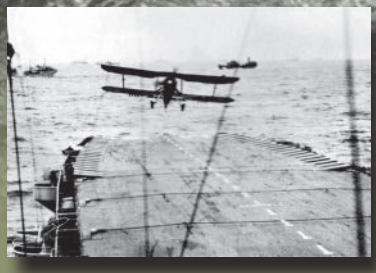
BRITISH ESCORT CARRIERS 1941–45





ANGUS KONSTAM

ILLUSTRATED BY PAUL WRIGHT

NEW VANGUARD 274

BRITISH ESCORT CARRIERS 1941–45

ANGUS KONSTAM ILLUSTRATED BY PAUL WRIGHT

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BRITISH ESCORT CARRIERS 1941–45

INTRODUCTION

In 1941, as the Battle of the Atlantic raged and ship losses mounted, the Admiralty desperately tried to find ways to defeat the U-boat threat to Britain's maritime lifeline. One solution was more escort vessels, equipped with ASDIC (sonar) and depth charges. Another was shore-based aircraft, flying long-range patrols over the Atlantic. Aircraft carriers were scarce, and needed elsewhere. So, as a stop-gap measure, in 1942 a few bulk-cargo merchant ships were converted into small merchant aircraft carriers (or 'MAC ships'). Although these carried just three or four aircraft, they still proved effective in protecting convoys. In the end a total of 17 of them were pressed into service. However, what was really needed was a larger aircraft carrier – something between a MAC ship and a fleet carrier.

The result was the development of the escort carrier. This was a small carrier, capable of providing a significant level of air protection for convoys, while also retaining the ability to perform other useful roles, such as hunting U-boats and serving as aircraft transports. As the war went on, more uses were found for them, including operating in support of amphibious operations, in massed carrier-based air attacks and in refuelling escort vessels whilst at sea. The first of these, HMS *Audacity*, was converted from a cargo liner, and entered service in the summer of 1941. Although her career lasted just six months, she proved her worth, and the Admiralty fully recognized the need for more of these versatile and effective ships.

By then though, thanks to the Lend-Lease arrangement with the United States, a growing number of American-built escort carriers began to enter service. The first arrived in November 1941, followed by three more in early 1942. Then, in the summer of 1943, a steady stream of American-built escort carriers were transferred into British service. While the majority of these were converted from the hulls of standardized merchant ships, these were eventually followed by ships built from the keel up as small aircraft carriers. Of the 38 American-built escort carriers provided through Lend-Lease, the majority were of the US Bogue-class design, modified slightly for British use.

The result of this was that by the end of 1943, the Royal Navy had sufficient carriers to provide protection for all of its major transatlantic convoys. This marked a turning point in the naval war. While some dubbed them 'Woolworth Carriers', as they seemed like small, cut-price versions of the real thing, they performed a vital function. By the end of the war,

43 had entered service, although three of these were lost in action. The aircraft they carried proved extremely effective at protecting convoys and in hunting U-boats. Collectively, their contribution to the Allied victory was immense, particularly in the long and gruelling campaigns fought in the Atlantic and Arctic. Without them, the war in Europe might have taken a very different course.

In this detail of a wartime poster by Roy Nockolds, an artist who in peacetime specialized in painting racing cars, an aircraft is shown making its final approach to an escort carrier, which is steaming in the middle of a convoy. Note the batsman, signalling 'correct approach'. (Author's collection)

DESIGN AND DEVELOPMENT

Background

The British Admiralty were slow to wake up to the value of the escort carrier. This is surprising given the proliferation of seaplane carriers during the last years of World War I. Eleven of them entered service during the war, and three of these were lost. In addition, the Royal Navy developed a fully fledged aircraft carrier – *Furious* – and by the end of the war she had been joined by the light carrier *Argus* and the hybrid *Vindictive*, part cruiser and part carrier. Two more light carriers, *Hermes* and *Eagle*, were added to the fleet during the 1920s. By the end of the decade they were joined by two more large carriers, *Courageous* and *Glorious*. So, the navy had three types of aircraft-carrying ships: seaplane carriers, whose primary role was maritime reconnaissance; fleet carriers, which were designed to operate with the main battle fleet; and the light carriers, which fulfilled a similar role, but which were able to operate in distant theatres, such as the China Station.

Two factors limited the development of British naval aviation during the inter-war years. The first was money. The British government drastically cut the naval budget after the war and scaled back the size of the fleet. This reduction in strength and budget was made possible through the terms of the Washington Naval Treaty signed in 1922, which saw a major reduction in the fleets of all the major naval powers. So, for much of the inter-war period parsimony would restrict any plans the Admiralty had to expand their carrier force. The second factor was control. Shortly after the end of the war, the Royal Air Force were given responsibility for all military and naval aviation. When the Fleet Air Arm (FAA) was formed on 1 April 1924, its ranks included all RAF personnel embarked on Royal Naval warships. However, it remained under RAF control.

This meant that while the Admiralty controlled its own carriers, the air crew and ground staff serving their aircraft were controlled by the air force. This unsatisfactory arrangement continued until May 1939. As a result, with their own limited resources, the RAF concentrated on the development of a land-based bomber force, and the fighters needed to protect it. The development of new naval aircraft was considered a lower priority. Similarly, with its own budget problems, the Admiralty relied for naval air cover on its fleet carriers, which were deployed in support of its main battle fleets. This meant that not only did the design of naval aircraft lag behind other rival powers, but a similarly low priority was placed on the development of new aircraft carriers. In fact, it was not until the late 1930s that plans for a new aircraft carrier were developed.

The Ruler-class escort carrier HMS *Patroller*, pictured in Canadian waters in early 1944, following a refit in Vancouver. She spent much of the remainder of the war escorting Atlantic convoys or ferrying aircraft.

During the 1930s, the Admiralty explored the idea of converting merchant ships into 'trade protection' carriers. The RAF were unwilling to permit any expansion of their naval aviation arm, so the idea foundered. Regardless, the Admiralty ordered the Director of Naval Construction (DNC) to produce plans for the conversion of merchant ships into these carriers, but this was abandoned due to a lack of resources. So, at the outbreak of war on 3 September 1939, the navy's carrier force consisted of an assortment of carriers that had been converted from other vessels, and one purpose-built modern fleet carrier, the *Ark Royal*. At first, the lack of 'trade protection' carriers was hardly felt. The Admiralty was not convinced that aircraft had a role to play in anti-submarine warfare. Instead, convoys would rely on their own escort ships for protection, augmented by the patrol aircraft of RAF Coastal Command.

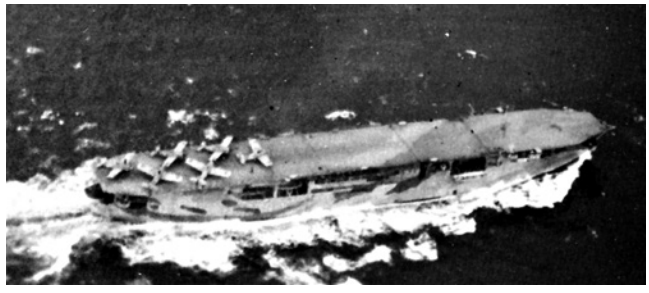
The short-sightedness of this policy was exposed in the summer of 1940, with the fall of France and Norway. Now, German bombers could range far out into the Atlantic, attacking convoys with relative impunity, while U-boats based in the French Atlantic ports could now reach the mid-Atlantic, far beyond the range of Coastal Command. As losses began to mount, the Admiralty realized their mistake, and began looking for a way to provide air cover for the vulnerable convoys. One solution was the Catapult-Armed Merchant Ship (or 'CAM ship'). A number of merchant ships were fitted with a fixed catapult in the bow, on which sat an RAF-manned Hurricane fighter. The idea was that the Hurricane could scout ahead of a convoy and report any U-boats it spotted in time for the convoy to change course. The problem was that afterwards, unless close to land, the fighter had to ditch in the sea. Clearly, this was a less than ideal solution to the problem.

By March 1941, it was clear that what Prime Minister Winston Churchill dubbed 'The Battle of the Atlantic' was now of critical importance. So, in March he issued a directive, outlining the importance of regaining the offensive in the campaign, and emphasizing the importance of aircraft in the fight against 'the U-boat menace'. In late 1940, the Admiralty had considered converting merchant ships into small aircraft carriers by removing their superstructure and replacing it with a rudimentary flight deck. The same notion had also been proposed in the United States at around the same time, and consequently the US Navy began developing plans for what they termed 'auxiliary carriers' (or 'AVGs'). In the Admiralty, Churchill's directive led to the first tentative steps along a similar path. The result would be the development of the world's first escort carriers.

HMS *Audacity*

The first British escort carrier resulted from the Admiralty's growing recognition that air power was becoming increasingly important in the naval war. By late 1940, the threat posed by German bombers, such as the four-engined Focke-Wulf Fw 200 Condor, had become so serious that the Admiralty felt it had to take steps to protect convoys passing within

reach of airfields in German-occupied France. So, the first of its escort carriers would be used to ward off this aerial threat, rather than the U-boat menace. First, though, they needed a suitable merchant ship to convert. Fortuitously, in March 1940 the German passenger-cargo ship *Hannover* was captured in the West Indies. Since then she had been renamed the *Empire Audacity* and used as a patrol and boarding vessel. Now, though, the Admiralty had other plans for her.



The first escort carrier in British service, having been converted from a captured cargo liner, HMS *Audacity* was little more than a rudimentary prototype. She lacked a hangar, so her aircraft had to remain ranged on deck. *Audacity* was torpedoed and sunk in December 1941, after escorting just four convoys. However, she proved that escort carriers were both viable and necessary.

In January 1941, she was taken to Bootle in Merseyside, where she was converted into a makeshift aircraft carrier. Her superstructure was removed, and in its place a flight deck was fitted. The engine uptakes were diverted so they discharged horizontally. She was flush-decked, with no island. Instead, the bridge and air control station were sited on a small platform on her starboard side. She had no hangar or lift, so her aircraft would have to be kept on the open flight deck. That meant the deck crew would have to move the parked aircraft aft for take-offs and forward for landings. She had no catapult of any kind, but at least she was fitted with four arrester wires, a safety wire and a crash barrier forward. For protection she carried a 4in gun in her stern and an assortment of 2-pdr and 20mm light anti-aircraft guns. Below decks, the layout of the cargo liner remained largely unchanged.

HMS Audacity	
Displacement	11,000 tons (deep load)
Dimensions	Length: 467ft 3in. Beam: 56ft 3in. Draught: 21ft 7in.
Propulsion	1 shaft Vulkan diesel, generating 5,200bhp
Maximum speed	14.5 knots
Fuel capacity	649 tons (diesel)
Range	12,000 miles at 14 knots
Armament	1 x 4in. high-angle (HA), 1 x 6-pdr, 4 x single 2-pdr, 4 x single 20mm Oerlikons
Sensors	Type 79 Air Search (AS) radar
Flight deck	453ft x 60ft steel plate
Catapult	None
Hangar	No hangar, no lift
Aviation fuel capacity	10,000 gallons
Aircraft	Up to 8
Complement	210

Empire Audacity was an austere and rather rudimentary solution to the problem, but she did the job she was designed for. Given the speed with which her conversion was planned and implemented, it was clear she would be a prototype, and future escort carriers would be better designed. She was towed to Blyth in Northumberland for fitting out, and by June 1941 she was undergoing her sea trials. A few weeks later she was renamed *Audacity*, as the Admiralty considered it a more suitable name for a warship. She also embarked her aircraft – a flight of Grumman Martlets (the FAA name for the Wildcat). Then, in mid-September, *Audacity* sailed in her first convoy. Within days her Martlets shot down their first Fw 200, and over the next

three convoy missions a further four kills were scored, and three more enemy aircraft damaged. The concept of the escort carrier had already proved its worth.

On 21 December, *Audacity* was torpedoed and sunk by a U-boat 430 miles west of Cape Finisterre, with the loss of 73 of her crew. One of the survivors was Eric 'Winkle' Brown, a Martlet pilot who had scored two of *Audacity*'s 'kills'. He would go on to become the FAA's most decorated aviator and Britain's leading test pilot. The loss of *Audacity* was a blow, but her short career had shown the value of a small aircraft carrier, working closely with a convoy and its escorts. As well as shooting down Condors, her Martlet pilots had sighted nine U-boats, one of which was subsequently sunk by surface escorts. Consequently, both the Admiralty and the Ministry of War Transport admitted the value of these escort carriers and set about finding other ships to convert.

Audacity class (1 ship in class)					
Vessel	**Original Builder**	**Launched**	**Converted**	**Completed**	**Fate**
Audacity (D10)	Bremer Vulkan, Bremen	29 March 1939 as *Hannover*	January–June 1941	20 June 1941	Sunk by *U-751*, 21 December 1941

Archer class

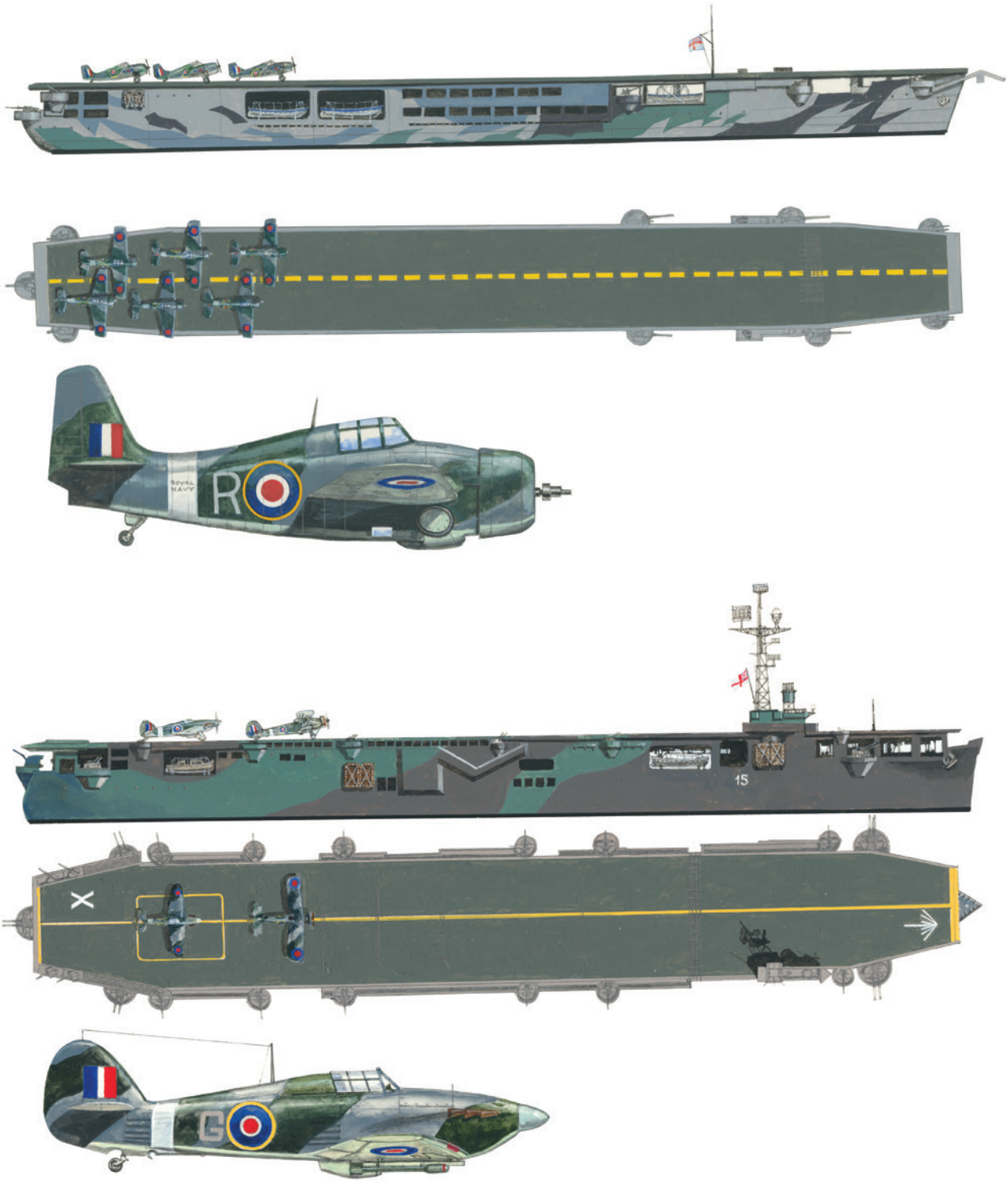
While *Audacity* was showing her worth at sea, a new group of escort carriers was under construction in a Pennsylvania shipyard. These, though, were not the first ship of this type to appear in the shipyard. Since the mid-1930s, the US Navy had been developing plans for what it called auxiliary aircraft escort vessels (designated AVGs), later known as auxiliary aircraft carriers (ACVs). Their primary role, however, was not to protect convoys from enemy aircraft and submarines, but to serve as ferries for aircraft and parts. The vastness of the Pacific Ocean made this a necessity for the US Navy. Consequently, in

A

BRITISH CONVERSIONS: HMS *AUDACITY* (1941) AND HMS *VINDEX* (1943)

The first of Britain's escort carriers was HMS *Audacity*, a ship which began life as the MV *Hannover*, a German cargo liner. In early 1941 she underwent a hasty conversion into a carrier, and entered service in June. The job of her eight Grumman Martlets was to provide fighter cover for Gibraltar convoys, which at the time were being harried by German long-range reconnaissance planes. Her fighters claimed their first victim in September, and over the next two months they shot down four more. However, in December *Audacity* was sunk by torpedoes from a German U-boat, 430 miles west of Cape Finisterre, while operating independently of a convoy. Despite her short career, *Audacity* proved the value of the escort carrier in convoy protection, and provided naval designers with valuable experience in the design requirements of this new type of warship. This shows her as she looked at the time of her loss. The aircraft shown beside her is the embarked Grumman Martlet (or Wildcat) of 802 NAS, flown by Sub Lt Eric 'Winkle' Brown.

By mid-1942, when work began on the conversion of three refrigerated cargo ships into escort carriers, the Admiralty had a better understanding of what these ships should look like. The result was the Nairana class, which consisted of *Campania*, *Nairana* and *Vindex*. Unlike *Audacity*, these ships had a full-length hangar and a lift, providing space for up to 20 aircraft. After entering service in December 1943, *Vindex* was attached to a U-boat 'hunter killer' force, and her Swordfish claimed their two shared 'kills' the following spring. For the rest of the war, *Vindex* provided anti-submarine protection to the Arctic convoys, where her Swordfish claimed one more 'kill' (*U-354*) and had a share of another. In this plate, *Vindex* carries the camouflage scheme she sported during the summer and autumn of 1944. Also shown is one of her Hawker Sea Hurricanes, operated by 825 NAS.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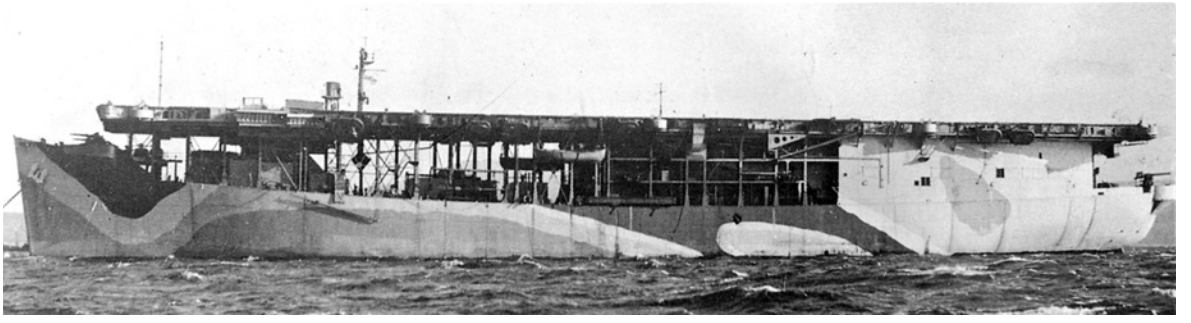


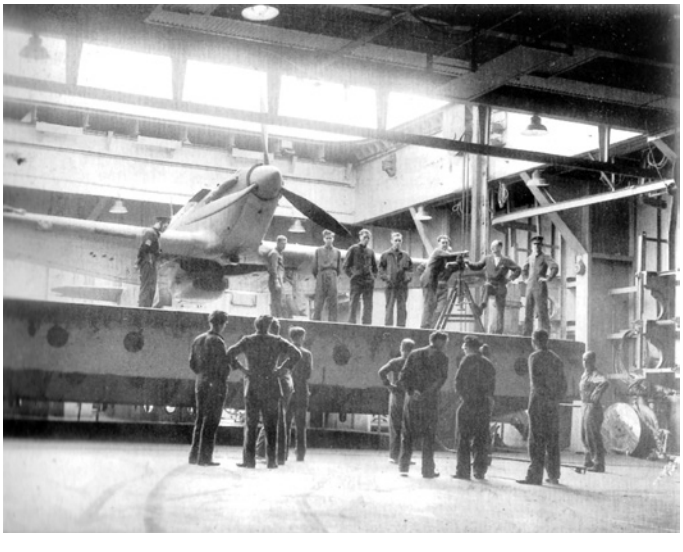
The first of the Lend-Lease escort carriers was HMS *Archer*. The first ship in her class, she was essentially a US Long Island-class vessel. She differed slightly from the three ships of her class that followed her by having a slightly longer flight deck and a much smaller island.

1941 they purchased six merchant ships from the Moore-Mackormick Line, with the intention of converting them into AVGs.

During the 1930s, the United States Maritime Commission (MARCOM) developed plans for a standardized series of merchant ships. These became known as Types C-1, C-2, C-3 and C-4, the numbers designating the size of the vessel, with C-4 being the largest. The vessels purchased by the navy were all C-3 vessels, which meant they displaced 12,000 tons when laden, with a hull length of 492ft (150m) and a beam of 69.5ft (21.2m). One of the purchased ships was the SS *Mormacmail*, then fitting out in Chester, PA. She was diesel-powered, and while slow, she was considered relatively easy to convert. The freighter's superstructure was removed and replaced with a wooden-planked flight deck that ended a little before the ship's bow and stern. A hangar and lift were provided, with fuel tanks added for the storing of aviation fuel. The hangar had space for up to 16 aircraft.

After entering service in the spring of 1942, HMS *Avenger* carried either Swordfish or Sea Hurricanes. As this photograph shows, the problem with the Hurricane was that its wings were not capable of folding. Consequently, they were a tight fit, both in the lift and in the hangar. *Avenger* was torpedoed and sunk that November.

In June 1941, this new carrier was commissioned as the USS *Long Island* (AVG-1). She was used exclusively as a transport and air crew training carrier, and in 1942 she was redesignated ACV-1. The term 'auxiliary carrier' wasn't liked by either the US Navy or the Royal Navy, so this was subsequently changed to 'escort carrier'. Eventually, in mid-1943, the *Long Island* was redesignated CVE-1. For the US Navy, the *Long Island* was one of a kind. By the time she entered service, the US Navy's conversion plans had changed slightly, and further US-built AVGs based on the same batch of purchased merchant ships would form the Charger and Sagamon classes. The US government was keen to honour its Lend-Lease commitment to the United Kingdom, so it earmarked some of the ships purchased for conversion for delivery to the Royal Navy. These were duly designated British AGVs, or BAGVs for short.



The first of these was BAVG-1, which became HMS *Archer*. She was built using the hull of the C-3 freighter *Mormacland*, in the same yard where the *Long Island* underwent her conversion. She was largely based on the *Long Island* design, with a flush-decked wooden-planked flight deck, stopping slightly short of her bow and stern. Like

Audacity, a platform on her starboard side served as the bridge and flying control position, but like the *Long Island* she was fitted with a hangar and a lift. *Archer* was also equipped with a hydraulic catapult. The only real drawback was in her American-designed propulsion system, which proved over-complex and prone to breakdowns. Ultimately this limited *Archer*'s effectiveness. However, she was commissioned in Newport News VA in November 1941, and by the following spring she was on active service in the Atlantic.

Archer class (also known as Archer and Avenger classes)	
Ships in class: 4: *Archer*, *Avenger*, *Biter*, *Dasher*	
Note: *Archer* was a forerunner of the other three ships in her class, and differed slightly from them. So *Archer* is sometimes listed as a single-ship class, while the remainder make up the three-ship Avenger class. Due to the similarity of their specifications, we have listed them as one composite class.	
Displacement	12,860 tons (deep load)
Dimensions	Length: 492ft Beam: 102ft 3in. Draught: 24ft 3in.
Propulsion	Single shaft, 4 clutched Busche-Sulzer diesel engines, generating 8,500bhp
Maximum speed	17 knots
Fuel capacity	1,430 tons (diesel)
Range	14,550 miles at 16 knots
Armament	3 x single 4in. guns, 6 x twin 20mm Oerlikons, 7 single 20mm Oerlikons
Sensors:	Type 79 AS, Type 271 Surface Search (SS) radars (*Archer*: Type 291 Air Search and Surface Search (AS/SS), Type 273 SS radars)
Flight deck	438ft x 70ft wood
Catapult	One (hydraulic): 3.5 ton capacity
Hangar	260ft x 62ft x 18ft 9in., two lifts (one forward, one aft)
Aviation fuel capacity	36,000 gallons
Aircraft	Up to 15
Complement	555

The US Navy still had four purchased merchant ships left. As with the others, these were bought while they were still being fitted out. It was decided to earmark three of them for Lend-Lease, while the fourth would be retained by the US Navy. In most respects these ships resembled the *Long Island* and *Archer*, with one notable exception. They were provided with a small box-like island on the starboard side of the flight deck. This feature would become standard in all the escort carriers which followed. They lacked a funnel, so engine exhausts were vented through ducts amidships, on either side of the flight deck. They also boasted a slightly enlarged hangar and a longer flight deck.

Charger was completed as BAVG-4, but in October 1941 she was reclaimed by the US Navy, becoming the USS *Charger*. She was used as a training carrier, primarily for FAA air crew. As such she was redesignated the AVG-30. The remaining three – *Avenger* (BAVG-2), *Biter* (BAVG-3) and *Dasher* (BAVG-5) – entered service with the Royal Navy during the spring and early summer of 1942. All three of them were modified slightly for British use. This included reducing the amount of aviation fuel bunkerage, which the Royal Navy considered an important safety measure. They also had their US guns replaced by British equivalents, the 4in. Mark V. More importantly, compared to *Archer* they were all considered mechanically reliable, as their Doxford diesel engines were more dependable than the Sulzer one fitted in *Archer*.

Archer class (4 ships in class)						
Vessel	**Original Builder**	**Laid Down**	**Launched**	**Converted**	**Completed**	**Fate**
Archer (D78)	Sun Shipbuilding, Chester PA	7 June 1939	14 December 1939 as *Mormacland*	May 1940–November 1941	17 November 1941	Returned to mercantile service, 1945
Avenger (D14)		28 November 1939	27 November 1940 as *Rio Hudson*	December 1940–March 1942	2 March 1942	Sunk by *U-155*, 15 November 1942
Biter (D97)		28 December 1939	18 December 1940 as *Rio Parana*	January 1941–April 1942	1 May 1942	Transferred to French service, 1945
Dasher (D37)		14 March 1940	12 April 1941 as *Rio de Janeiro*	November 1941–June 1942	1 July 1942	Sunk by U-boat, 27 March 1943

British builds

The value shown by *Audacity* led to the conversion of five more merchant ships in British shipyards. The first of these was the *Telemachus*, a fast refrigerated ship, built in Dundee. She was launched in May 1942 and purchased by the Admiralty for conversion into 'Auxiliary Aircraft Carrier Type C'. She was converted in just four months, and in September she was commissioned into the Royal Navy as the *Activity*. She was a useful addition to the fleet, but she compared unfavourably with the US-designed and built escort carriers which were then entering service. For a start she had a small hangar, and could only accommodate ten aircraft. *Activity* had a lengthy steel flight deck, though, and a small island well forward on her starboard side.

Activity class (1 ship in class)					
Vessel	**Original Builder**	**Launched**	**Converted**	**Completed**	**Fate**
Activity (D94)	Caledon Shipyards, Dundee	30 May 1942 as *Telemachus*	June–September 1942	14 October 1942	Scrapped, 1946

B

AVENGER AND ATTACKER CLASSES: HMS *BITER* (1942) AND HMS *BATTLER* (1944)

The entry of the United States into the war in December 1941 resulted in the supply of Lend-Lease escort carriers, converted from merchant ships that had been built to a regulated design. The first of these, HMS *Archer*, was followed by three Avenger-class carriers, whose design was based on the US Long Island class. Of these three, HMS *Biter* was commissioned into the Royal Navy in May 1942, although due to modifications and teething problems it was October before she became fully operational. Subsequently she saw service in the Mediterranean and the Atlantic. *Biter* had a wooden flight deck and a single hangar, giving her the capacity to carry 15 aircraft, although this was later increased to 21, of which six were fighters. Here, *Biter* is shown as she appeared in late 1942, while providing cover for Atlantic convoys. Also pictured is a Fairey Fulmar, of 808 NAS, her embarked squadron at the time.

The US Bogue class of auxiliary carriers were ordered in the immediate aftermath of Pearl Harbor, their design based on the US Navy's experience with their predecessors the *Charger* and *Long Island*. Once again, they were converted from the hulls of standardized merchant ships. Eleven of these entered service with the US Navy, while the same number were transferred to the Royal Navy, becoming Attacker-class escort carriers. HMS *Battler* was commissioned in late 1942, and subsequently spent most of the remainder of the war in the Mediterranean theatre. Here, *Battler* appears in the scheme she adopted in 1944, while operating in the Aegean. At the time she operated Supermarine Seafires belonging to 834 NAS.

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K

HMS *Activity*	
Displacement	14,250 tons (deep load)
Dimensions	Length: 512ft Beam: 66ft 6in. Draught: 25ft 1in.
Propulsion	2 shaft Burmeiser & Wain diesels, generating 12,000bhp
Maximum speed	18 knots
Fuel capacity	2,000 tons (diesel)
Range	4,500 miles at 18 knots
Armament	1 x twin 4in gun, 6 x twin 20mm Oerlikons, 8 x single 20mm Oerlikons
Sensors	Type 79 AS, Type 271 SS radars
Flight deck	498ft x 66ft steel plate
Catapult	None
Hangar	87ft x 59ft x 21ft, one lift aft
Aviation fuel capacity	20,000 gallons
Aircraft	Up to 15
Complement	700

While work on her conversion was under way, the Admiralty also purchased the Union Castle passenger liner *Pretoria Castle*. When the war began she had been employed as an armed merchant cruiser, but in the summer of 1942 the Admiralty decided to turn her into another escort carrier. After her elegant superstructure was removed, a full-length flight deck was added, and a small low-sitting island placed on her starboard side, a little forward of amidships. The *Pretoria Castle* had a forward lift, allowing access to a capacious hangar, and a steam catapult was mounted amidships on her flight deck, together with six arrester wires aft. She was commissioned in the summer of 1943, but apart from the occasional operational foray she spent most of her wartime career as a training and trials carrier.

Pretoria Castle class (1 ship in class)					
Vessel	**Original Builder**	**Launched**	**Converted**	**Completed**	**Fate**
Pretoria Castle (F61)	Harland & Wolff, Belfast	12 October 1938 as *Pretoria Castle*	June 1942–April 1943	9 April 1943	Scrapped, 1946

The escort carrier HMS *Pretoria Castle* was converted from a passenger liner turned armed merchant cruiser, and entered naval service in the summer of 1943. Although she occasionally operated in support of convoys, she spent most of her career as a training ship for Fleet Air Arm aircrew.

Like *Activity*, three more escort carriers were converted from the hulls of fast refrigerated cargo ships. They were all considerably superior to *Activity* in terms of their facilities and their performance. The first two – *Nairana* and *Vindex* – were converted in Clydeside and Tyneside respectively, using the hulls of cargo ships which were then fitting out. The third, *Campania*, was

During 1942–44, HMS *Campania* was converted from a fast cargo ship laid down in Belfast in 1941. During *Campania*'s career she was used to escort both Atlantic and Arctic convoys, although her aircraft also conducted attacks on enemy shipping in Norwegian waters.

similar, but slightly larger, so she is sometimes erroneously regarded as a one-ship class. In fact, all three followed a standard design, making *Campania* merely a modification of the larger three-ship class. Like the British escort carriers that preceded them, these ships had riveted hulls, something the Admiralty considered vital if the ships were to operate in Arctic waters, as their plate joints were better able to cope with the extremes of temperature.

HMS *Pretoria Castle*	
Displacement	23,450 tons (deep load)
Dimensions	Length: 592ft Beam: 76ft 4in. Draught: 29ft 10in.
Propulsion	2 shaft Burmeiser & Wain diesels, generating 16,000bhp
Maximum speed	18 knots
Fuel capacity	2,430 tons (diesel)
Range	16,000 miles at 16 knots
Armament	2 x twin 4in. guns, 2 x quadruple 2-pdr 'pom-poms', 10 x twin 20mm Oerlikons
Armour	1in. plating over bomb room, magazines and steering gear
Sensors	Type 291 joint AS/SS Type 271 SS radars
Flight deck	550ft x 76ft steel plate
Catapult	One (cordite powered): 7 ton capacity
Hangar	354ft x 46ft x 17ft, one lift forward
Aviation fuel capacity	74,000 gallons
Aircraft	Up to 21
Complement	554

Like *Activity* and *Pretoria Castle*, they had a small island, and a full-length steel flight deck. However, they lacked a catapult. Their forward lift, though, gave access to a spacious hangar, and they had considerably more aviation fuel bunkerage than *Activity*. The three Nairana-class escort carriers performed well in the extreme conditions found in the North Atlantic and Arctic, so ultimately all three of them saw service protecting the Arctic

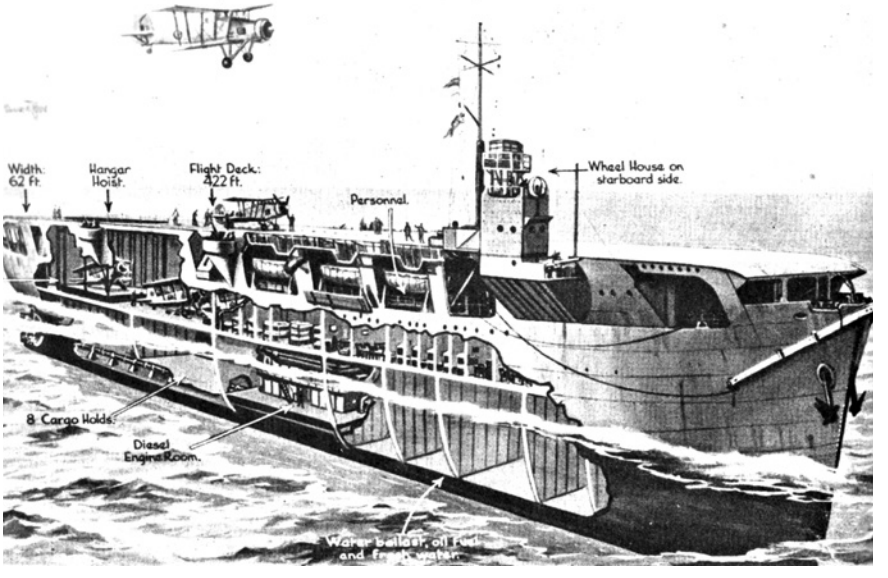
convoys. However, by the time they entered service in late 1943 and early 1944, a whole new generation of American-built escort carriers had arrived through the Lend-Lease arrangement, negating the need to convert further British merchant ships into carriers. So, they became the last British-built escort carriers of the war.

Nairana class (also known as Nairana and Campania classes)	
Ships in class: 3: *Campania*, *Nairana*, *Vindex* Note: *Campania* differed slightly from the other two ships in her class	
Displacement	17,210 tons (deep load), (*Campania*: 15,970 tons [deep load])
Dimensions	Length: 524ft Beam: 68ft Draught: 23ft 7in. (*Campania*: Length: 540ft Beam: 70ft Draught: 25ft 9in.)
Propulsion	Twin shafts, 2 Doxford diesel engines, generating 10,700bhp (*Campania*: Twin shafts, 2 Burmeister & Wain diesel engines, generating 13,250bhp)
Maximum speed	17 knots (*Campania*: 18 knots)
Fuel capacity	1,655 tons (diesel) (*Campania*: 2,230 tons [diesel])
Range	13,000 miles at 16 knots (*Campania*: 17,000 miles at 17 knots)
Armament	1 x twin 4in. gun, 4 x quadruple 2-pdr 'pom-poms', 8 x twin 20mm Oerlikons
Sensors	Type 291 AS/SS radar (1944 on: also Type 291 AS/SS radar)
Flight deck	502ft x 66ft steel plate (*Campania*: 515ft x 70ft steel plate)
Catapult	None
Hangar	231ft x 61ft x 17ft 6in., (*Campania*: 198ft x 63ft x 17ft 6in.), one lift aft
Aviation fuel capacity	52,000 gallons
Aircraft	Up to 20
Complement	554 (*Campania*: 639)

Nairana class (3 ships in class)					
Vessel	**Builder**	**Laid Down**	**Launched**	**Completed**	**Fate**
Campania (D48)	Harland & Wolff, Belfast	12 August 1941	17 June 1943	7 March 1944	Scrapped, 1955
Nairana (D05)	John Brown, Clydebank	7 November 1941	20 May 1943	12 December 1943	Scrapped, 1948
Vindex (D15)	Swan Hunter, Wallsend	1 July 1942	4 May 1943	3 December 1943	Scrapped, 1947

'MAC ships'

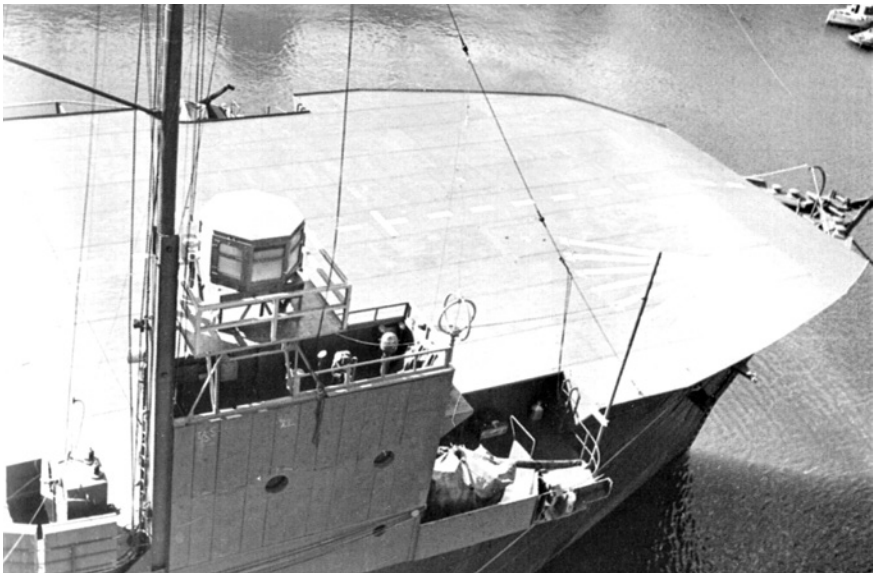
The idea behind the Merchant Aircraft Carrier, or 'MAC ship', was simple. Churchill's 'Battle of the Atlantic Directive' of March 1941 highlighted the need for aircraft-carrying ships to detect U-boats operating in mid Atlantic. The introduction of CAM ships was very much a stop-gap measure. What was really needed was a small aircraft carrier, capable of operating Combat Air Patrols (CAP) over the convoy and ahead of it. In 1941, Captain Matthew Slattery, Director of Air Material at the Admiralty, proposed the conversion of a merchant ship into a makeshift carrier. It would retain most of its cargo-carrying capacity, but with a flight deck replacing its superstructure it would be able to act as a small escort carrier. Again, this was another stop-gap measure until proper escort carriers entered service. In the end, though, delays in the development of these MAC ships meant that they would only start entering service at the same time as fully fledged escort carriers began arriving in significant numbers.



This cutaway diagram, published in the *Illustrated London News* in late 1943, shows the internal layout of a Merchant Aircraft Carrier, or MAC ship. It appears to be based on the MV *Empire MacAlpine*. Note how her forward holds are still earmarked for carrying grain.

MAC ships (grain carriers)	
Ships in category: 6: *Empire MacAlpine*, *Empire MacAndrew*, *Empire MacCallum*, *Empire MacDermott*, *Empire MacKendrick*, *Empire MacRae*	
Note: Exact specifications vary slightly. The following specifications are for the MV *Empire MacAlpine*	
Displacement	12,000 tons (deep load)
Dimensions	Length: 459ft Beam: 62ft Draught: 24ft 6in.
Propulsion	Single shaft, 1 Doxford diesel engine, generating 3,500bhp
Maximum speed	12.5 knots
Fuel capacity	3,000 tons (diesel). Range unspecified
Cargo capacity	80 per cent of amount carried by standard merchant ship
Armament	1 x single 4in. gun, 2 x single 40mm Bofors, 4 x single 20mm Oerlikons
Sensors	Type 79 AS radar
Flight deck	410ft x 62ft wood
Catapult	None
Hangar	142ft x 38ft x 24ft, one lift aft
Aviation fuel capacity	5,000 gallons
Aircraft	Up to 4 Swordfish
Complement	107

One reason for the delay was the Admiralty itself, who were convinced that Slattery's MAC ships wouldn't work. The Fleet Air Arm thought that with a maximum speed of just 12 knots they would be too slow to allow aircraft to take off from their decks. The Director of Naval Construction argued that it would take more than a year to design such a vessel, and his planners would be better employed designing other, more practical vessels. Slattery then found an ally in Sir James Lithgow, director of the Lithgow shipyard group. Allegedly, Sir James sketched out the design of a MAC ship on the back of an envelope and promised to supply two ships suitable for conversion. Other allies were Sir Amos Ayre, Director of Merchant Shipbuilding, and Sir Douglas Thomson, Director of the Ben Line. In the end the Admiralty acceded to this pressure and agreed to allow the project to go ahead.



The forward flight deck and island of the MAC ship MV *Empire MacAlpine*. The fan-shaped lines painted on her deck are used in conjunction with a steam generator to indicate wind direction over the flight deck.

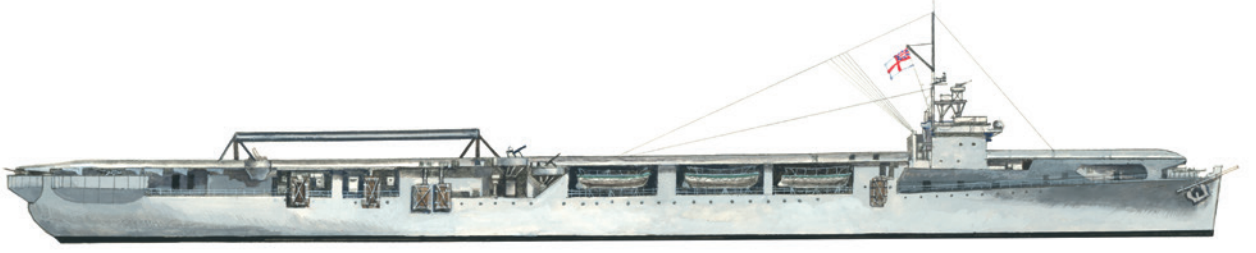
Work began on the conversion of the first MAC ship, the *Empire MacAlpine*, in the summer of 1942. She was newly laid down, so the conversion was more straightforward than it would have been for a completed ship. Other MAC ships built to a similar plan would follow during 1943. Slattery's design called for the use of grain ships, as they were wide-beamed enough to provide a stable platform for a flight deck. The other advantage of grain ships was that, like tankers, they unloaded their cargo by means of pipelines, so they did not rely on deck hatches. This meant that in theory a flight deck would not get in the way of cargo operations. From the start, these ships were intended to be cargo-carrying merchant ships. While they resembled aircraft carriers, they flew the merchant naval ensign, and with the exception of the embarked air crew and maintenance staff, they were crewed and commanded by merchant seamen.

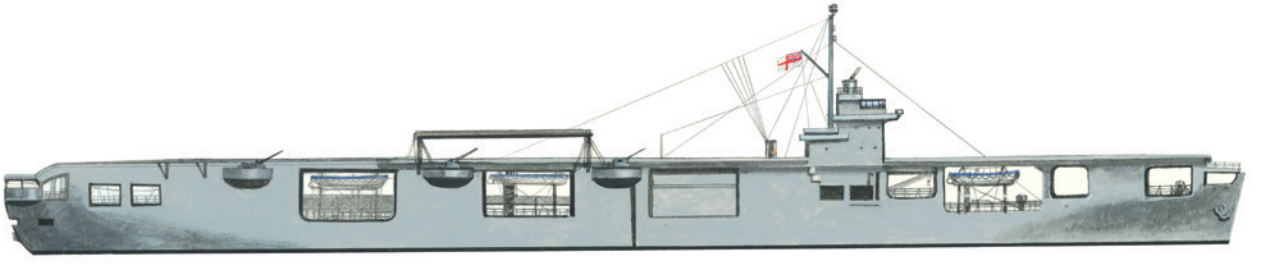
C

MERCHANT AIRCRAFT CARRIERS: MV *EMPIRE MACALPINE* (1943) AND MV *RAPANA* (1943)

The Merchant Aircraft Carrier (or 'MAC ship') was developed as a stop-gap measure, to provide convoys with limited protection while the escort carriers could enter service. Despite this, with the exception of *Audacity*, the first of both types of carrier arrived at the same time, during the last months of 1942. The MAC ships were converted from either bulk grain ships or tankers. Technically they remained merchant ships, and retained much of their cargo capacity throughout the war. Afterwards they were converted back into civilian vessels. The MV *Empire MacAlpine* was the first of these, with a wooden flight deck added in place of her superstructure, complete with a small island. Her after cargo holds were converted into a small hangar, serviced by a lift. She had space for four Swordfish, and in May 1943, when the first of these landed on the *Empire MacAlpine*, it became the first aircraft to land on the deck of a merchant vessel. This plate shows her as she appeared that summer. Also pictured is one of her embarked aircraft, a Fairey Swordfish of 836 Squadron FAA, who supplied aircraft for all the MAC ships.

Initially there were reservations about converting tankers into MAC ships, due to their relatively low freeboard compared to grain carriers and the volatility of their cargo. However, these were overcome, and in early 1943 work began on the conversion of the tanker MV *Rapana* into a MAC ship. This process took just five months, and she entered service that July. She retained much of her fuel-carrying capacity, but unlike the *Empire MacAlpine* she lacked a hangar. Consequently, *Rapana* only had space for three Swordfish. This shows *Rapana* as she looked in the Atlantic in autumn 1943, and (below, smaller) before her conversion.





The MAC ship MV *Empire MacKendrick* was converted from a bulk grain carrier in 1943 and took up active service in January 1944. She was named after Commander Douglas MacKendrick of HMS *Audacity*, who lost his life when the carrier was torpedoed in December 1941.

When completed, the MV *Empire MacAlpine* had a small and narrow flight deck, but unlike the first escort carrier she had a hangar, converted from a space which would otherwise have formed her after hold. This was serviced by a lift, and the flight deck was capped by a small rectangular island. The only aircraft which was considered suitable to operate from her was the Fairey Swordfish. This lumbering biplane had a low take-off and landing speed, but she was also robust and ideally suited to conduct the kind of air patrols Slattery had envisaged. A total of four Swordfish could be accommodated, which was just enough to ensure that a CAP could be maintained over a convoy. All of the Swordfish earmarked for service with MAC ships were supplied by 836 Squadron FAA, which was based at RNAS Maydown in Northern Ireland. In May 1943, when the squadron CO, Lt Cdr Slater, landed his Swordfish on the *Empire MacAlpine*, he became the pilot of the first aircraft ever to land on a merchant ship.

MAC ships – Grain Carriers (6 in group)

Vessel	Conversion	Launched	Completed	Fate
Empire MacAlpine (MH)	Burntisland Shipbuilding Co, Fife	23 December 1942	14 April 1943	All converted and returned to mercantile service, 1945
Empire McKendrick (MO)		29 September 1943	12 December 1943	
Empire MacAndrew (MK)	William Denny, Dunbarton	3 May 1943	16 July 1943	
Empire MacDermott (MS)		24 January 1944	31 March 1944	
Empire MacRae (MU)	Lithgows, Port Glasgow	21 June 1943	24 September 1943	
Empire MacCallum (MN)		12 October 1943	28 December 1943	

Then, as the first batch of MAC ships was entering service or nearing completion, John Lamb, Technical Director of the Anglo-Saxon Petroleum Company, suggested converting tankers into MAC ships. This was viewed with some trepidation by the Admiralty, who felt that the risks inherent in fuel-filled ships would be too great. However, Lamb convinced them otherwise, and his company offered up its entire fleet of 'Triple Twelve' tankers. So in the spring and summer of 1943 the tanker *Rapana* underwent conversion. Tankers had a lower freeboard than grain ships, so the basic design was altered slightly. The main difference, though, was that the *Rapana* and the tanker MAC ships which followed her lacked a hangar. Also, their

capacity was limited to just three Swordfish. In the end, nine tankers were converted into MAC ships, seven of which flew the British merchant ensign while two served under the Dutch flag.

MAC ships (older tankers)	
Note: Exact specifications vary slightly. The following specifications are for the MV *Rapana*	
Two more similar MAC ships (*Gadila* and *Macoma*) operated under the Dutch flag	
Ships in category: 7: *Acavus*, *Adula*, *Alexia*, *Amastra*, *Ancylus*, *Miralda*, *Rapana*	
Displacement	16,000 tons (deep load)
Dimensions	Length: 482ft 9in. Beam: 62ft Draught: 27ft 6in.
Propulsion	1 shaft Sulzer diesel, generating 4,000bhp
Maximum speed	12.5 knots
Fuel capacity	3,100 tons (diesel). Range unspecified
Cargo capacity	90 per cent of amount carried by standard merchant ship
Armament	1 x single 4in. gun, 2 x single 40mm Bofors, 6 x single 20mm Oerlikons
Sensors	Type 79 AS radar
Flight deck	462ft x 62ft wood
Catapult	None
Hangar	No hangar or lift
Aviation fuel capacity	5,000 gallons
Aircraft	Up to 3 Swordfish
Complement	118

All of these tankers were vessels that had already been built. At the same time, another batch of four tankers were converted while still on the stocks, much as the grain ships had been. Like the 'Triple Twelve' ships, though, they lacked a hangar. This may have been a disadvantage for the embarked air crews, but it meant that without a hangar taking up cargo space, these ships could carry up to 90 per cent of their oil consignment. In practice, some degree of planning was required to ensure that all of these MAC ships operated to full capacity, while making the best possible use of the air cover they provided.

MAC ships (newer tankers)	
Note: Exact specifications vary slightly. The following specifications are for the MV *Empire MacKay*	
Ships in category: 4: *Empire MacCabe*, *Empire MacColl*, *Empire MacKay*, *Empire MacMahon*	
Displacement	12,000 tons (deep load)
Dimensions	Length: 485ft 9in. Beam: 61ft 9in. Draught: 27ft 6in.
Propulsion	Single shaft, 1 Burmeister and Wain diesel engine, generating 3,300bhp
Maximum speed	11 knots
Fuel capacity	5,000 tons (diesel). Range unspecified
Cargo Capacity	85 per cent of amount carried by standard merchant ship
Armament	1 x single 4in. gun, 8 x single 20mm Oerlikons
Sensors	Type 79 AS radar
Flight deck	460ft x 62ft wood
Catapult	None
Hangar	No hangar or lift
Aviation fuel capacity	4,000 gallons
Aircraft	Up to 3 Swordfish
Complement	110

To help in this, oil loading facilities were established in Halifax, Nova Scotia, so both types of MAC ship could load and unload in that port, which served as a convoy terminus. In Britain, MAC grain ships used Liverpool as their terminus, while tankers used the Clyde. This fragile balance between naval and mercantile needs seemed to work, and as a result Atlantic convoys enjoyed a level of air cover that they might otherwise not have enjoyed. The MAC ship concept proved its worth, as reflected in the marked reduction in merchant ship losses, particularly in convoys where MAC ships operated.

MAC ships – Tankers
Older conversions ('Triple Twelve' tankers) (7 in group)

Vessel	Original Builder	Launched	Commissioned as MAC ship	Fate
Acavus (MA)	Workman Clark & Co., Belfast	November 1934	October 1943	All converted and returned to mercantile service, 1945
Adula (MQ)	Blythswood Shipbuilding, Scotstoun, Glasgow	January 1937	February 1944	
Alexia (MP)	Bremer Vulkan, Bremen	December 1934	December 1943	
Amastra (MD)	Lithgows, Port Glasgow	December 1934	September 1943	
Ancylus (MF)	Swan Hunter, Wallsend	October 1934	October 1943	
Miralda (MW)	Nederlandse Scheepsbouw, Amsterdam	July 1936	January 1944	
Rapana (MV)	Wilton-Fijenoord, Schniedam	March 1935	July 1943	

Note: Two more MAC ships, MV *Gadila* and MV *Macoma,* owned by the Royal Dutch/Shell Line, were also converted from tankers, but operated under the Dutch flag

MAC ships – Tankers
New builds

Vessel	Conversion	Launched	Commissioned as MAC ship	Fate
Empire MacKay (MH)	Harland & Wolff, Govan	17 June 1943	5 October 1943	Converted and returned to mercantile service, 1945
Empire MacColl (MB)	Cammell Laird, Birkenhead	24 July 1943	13 November 1943	
Empire MacMahon (MJ)	Swan Hunter, Wallsend	2 July 1943	16 December 1943	
Empire MacCabe (MC)		18 May 1943	21 December 1943	

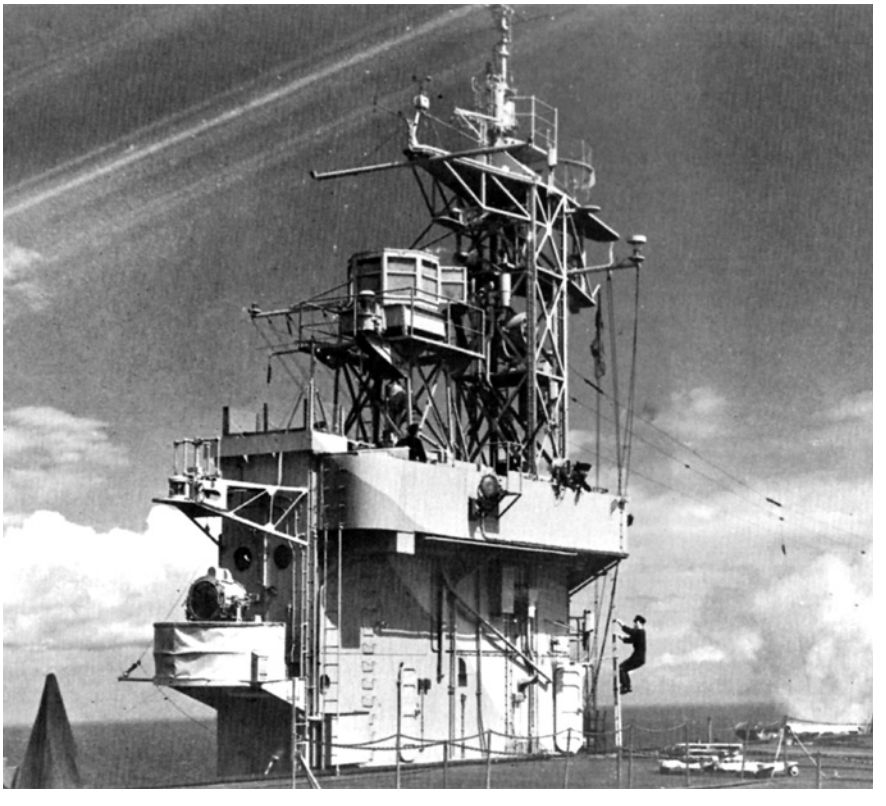
Attacker class

By late 1941, as British merchant ship losses mounted steadily, diplomatic pressure was put on the United States to supply more escort carriers through the Lend-Lease programme. By then the USS *Long Island* was in service and

the USS *Charger* was being fitted out. Designers and senior American naval officers were therefore able to draw on the experience gained in building these ships, as well as the four auxiliary carriers of the US Sangamon class, which were also nearing completion. Shortly after Pearl Harbor, the US government authorized the purchase and conversion of 20 more Type C3 merchant ships for conversion into carriers. Later, two more ships were purchased for the same purpose. These 22 ships would be split equally between the US Navy and the Royal Navy. The 11 in US service would form the Bogue class, while their British counterparts would become the Attacker class.

This equal split in the pool of ships led to greater consideration being paid to the needs of the Admiralty. As their first auxiliary carriers had been designed primarily as aircraft transports, they lacked the hangar space needed to accommodate a large self-contained air group. Now, partly due to the request of the Admiralty, these new ships would have a much larger hangar, running virtually the full length of the ship. It would also be serviced by two lifts, one forward and one aft. The result was a design that could accommodate up to 20 aircraft, although in the Bogue class this was increased to 28.

If used as an aircraft transport, up to 90 aircraft could be accommodated on the flight deck. This wood-planked flight deck made from Oregon pine was larger than the deck in the Archer class, and a hydraulic catapult was fitted at its forward end, capable of launching a 3.5 ton plane at a speed of 61 knots. The flight deck was provided with nine arrester wires and three safety barriers. In terms of air group handling and operation, these ships represented a significant step forward compared to their predecessors.



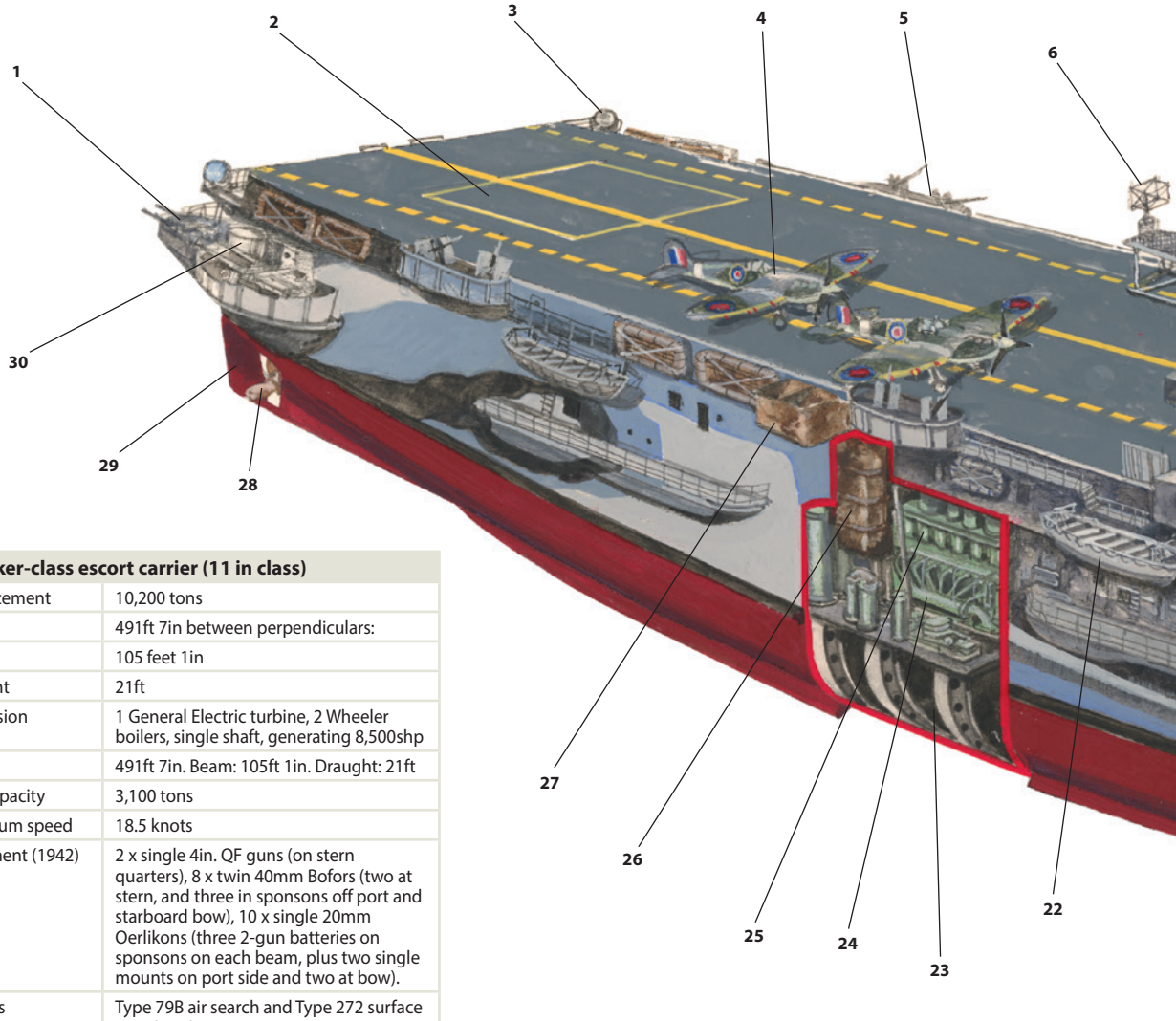
The island of the Attacker-class escort carrier HMS *Tracker*. This island, mounted on the carrier's starboard side, served the joint function of being a bridge as well as a flight control position. On top of the bridge is *Tracker*'s Type 79 air search radar housing, while above it is a Type 271 surface search radar antenna.

D

HMS *ATTACKER* (1942)

Like the other ten carriers of her class, *Attacker* was essentially a US Bogue-class escort carrier, built to US Navy specifications but modified slightly for British use. The namesake of her class, the escort carrier HMS *Attacker* began life as the merchantman SS *Steel Artisan*, launched in San Francisco in September 1941. After Pearl Harbor, the hull was requisitioned by the US Navy and then earmarked for the Royal Navy through the Lend-Lease programme. After being completed in San Francisco, she underwent further modifications in Liverpool before joining the Mediterranean Fleet in August 1943.

Attacker subsequently saw action off Salerno in Italy before returning to Britain for a refit. She returned to the Mediterranean in May 1944, and then participated in the Allied landings in Southern France. She remained in the Mediterranean until the following spring, when she was sent east to join British naval forces operating in Malaysian waters, where she remained until the end of the war in the Pacific. In January 1946 she was returned to the USA, and was subsequently reconfigured as a merchant ship, remaining in use until 1980. She is shown here in the camouflage scheme she wore in the autumn of 1943 while operating off the Salerno beachhead.



Attacker-class escort carrier (11 in class)	
Displacement	10,200 tons
Length	491ft 7in between perpendiculars:
Beam	105 feet 1in
Draught	21ft
Propulsion	1 General Electric turbine, 2 Wheeler boilers, single shaft, generating 8,500shp
Length	491ft 7in. Beam: 105ft 1in. Draught: 21ft
Fuel capacity	3,100 tons
Maximum speed	18.5 knots
Armament (1942)	2 x single 4in. QF guns (on stern quarters), 8 x twin 40mm Bofors (two at stern, and three in sponsons off port and starboard bow), 10 x single 20mm Oerlikons (three 2-gun batteries on sponsons on each beam, plus two single mounts on port side and two at bow).
Sensors	Type 79B air search and Type 272 surface search radars
Aircraft	18 Supermarine Seafires (879 and 886 squadrons, FAA)
Complement	646

KEY

1. Twin 40mm Bofors gun (one of two at stern)

2. After lift

3. Landing guidance lights (one of two at stern)

4. Supermarine Seafire fighter (18 carried on board)

5. Single 20mm Oerlikon mount (one of ten, mounted on sponsons outboard of flight deck)

6. Type 281 air search radar

7. Type 79 air search radar and Type 242 IFF array (originally fitted with US Navy SC air search radar)

8. Compass platform

9. Type 279 surface search radar in 'lantern' housing

10. Bridge and 'Flyco' (flying control position)

11. Searchlight

12. Twin 40mm Bofors gun (one of two on forward sponsons)

13. Hydraulic catapult

14. Wind direction indicator

15. Capstan and forecastle

16. Bow anchor (one of two)

17. Twin 40mm Bofors gun (one of two on forecastle)

18. Aircraft hangar

19. Aviation munitions magazine (one of two)

20. Forward lift

21. Carley floats

22. Ship's boat (one of four)

23. Lower hull and fuel tanks

24. General Electric geared turbine

25. Foster Wheeler boiler (one of two)

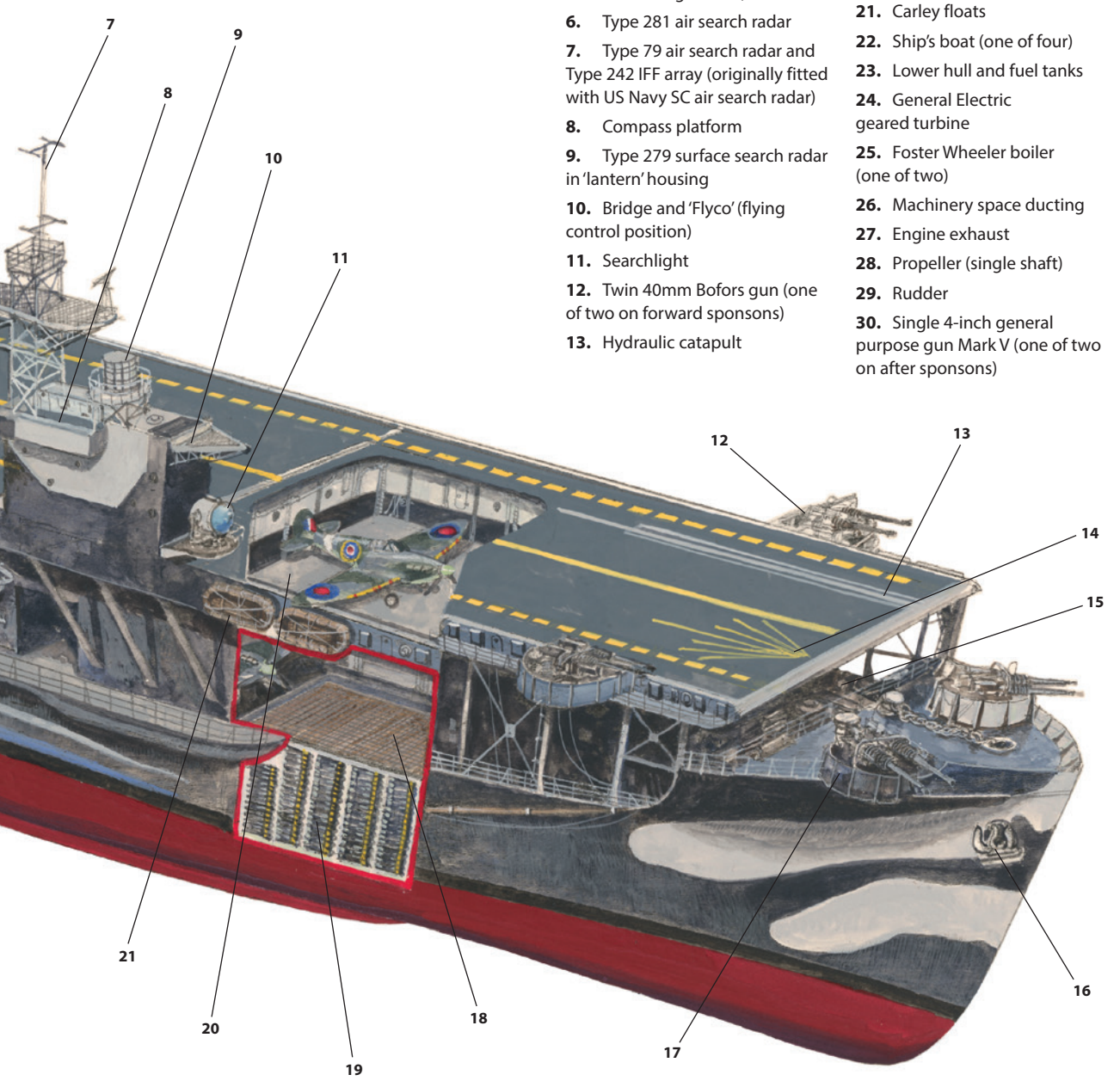
26. Machinery space ducting

27. Engine exhaust

28. Propeller (single shaft)

29. Rudder

30. Single 4-inch general purpose gun Mark V (one of two on after sponsons)



In this photograph of the Attacker-class escort carrier HMS *Pursuer* taken in 1945, she bears the colour scheme of the British East Indies Fleet. Unusually, she sports a US Navy-style identification number to reduce the risk of air attack from her allies.

Flying operations were supervised from the flying control position (or 'Flyco') situated on top of a small box-like island, sited forward on the starboard side. The island also housed the ship's bridge or compass platform, and was topped by a distinctive lattice mast designed to support an air warning radar. Space inside the island was also allocated for the captain and navigating officer's sea cabins, and for a small chartroom. These ships also boasted better watertight sub-division than their predecessors. The hulls had been purchased shortly after they had been laid down, so it was easier to incorporate more watertight bulkheads. Below decks these ships were reasonably spacious, although the hangar sloped upwards slightly towards the bow and stern, following the curvature of the hull, which made moving aircraft onto and off the lifts slightly harder. All in all, though, these ships were extremely well designed.

Attacker class	
Ships in class: 11: *Attacker*, *Battler*, *Chaser*, *Fencer*, *Hunter*, *Pursuer*, *Ravager*, *Searcher*, *Stalker*, *Striker*, *Tracker*	
Displacement	14,400 tons (deep load)
Dimensions	Length: 491ft 7in. Beam: 105ft 1in. Draught: 21ft
Propulsion	Single shaft, 1 General Electric geared turbine, 2 Foster Wheeler boilers, generating 8,500bhp
Maximum speed	18 knots
Fuel capacity	3,123 tons (fuel oil)
Range	27,300 miles at 11 knots
Armament	2 x single 4in. guns, 4 x twin 40mm Bofors, 8 x twin 20mm Oerlikons, 6–10 single 20mm Oerlikons (quantity varied from ship to ship)
Sensors	Type 79 or Type 279 AS, Type 271 or Type 272 SS radars. HF/DF carried in *Battler*, *Chaser*, *Fencer*, *Striker*, *Pursuer* and *Tracker*
Flight deck	442ft x 88ft wood over steel plate
Catapult	One (hydraulic – tail down): 3.5 ton capacity
Hangar	262ft x 62ft x 18ft, two lifts (one forward, one aft)
Aviation fuel capacity	44,800 gallons
Aircraft	Up to 20
Complement	646

In terms of crew comfort, they were built according to American practices rather than British ones. This meant that air conditioning was provided – a feature lacking in other British carriers – and the crew were accommodated in bunks rather than hammocks, another new departure for the Royal Navy. The first of them, HMS *Attacker*, entered service in October 1942, with the other ten following over the next eight months. Once in British hands they were modified slightly to conform to British safety standards by having their aviation fuel bunkerage reduced, and their US-designed 5in. guns were replaced with American 4in. ones instead, which could take British shells. Finally, they were fitted with British radar systems, and in some cases HF/DF ('Huff Duff') radio direction-finding sets. Despite these minor modifications, the Admiralty were delighted with their new escort carriers. Their arrival really helped to turn the tide in the Battle of the Atlantic.

The Attacker-class escort carrier HMS *Fencer* spent much of her career on convoy protection duties, but in March 1944 she took part in Operation *Tungsten*, a Fleet Air Arm attack on the German battleship *Tirpitz*, then based in northern Norway. Her Wildcats and Swordfish protected the task force during the operation.

Attacker class (11 ships in class)

Vessel	Builder	Laid Down	Launched	Completed	Fate
Attacker (D02)	Western Pipe & Steel Co., San Francisco, CA	17 April 1941	27 September 1941	10 October 1942	Returned to US ownership, 1946
Battler (D18)	Ingalls Shipbuilding, Pascagoula, MS	15 April 1941	4 April 1942	15 November 1942	
Chaser (D32)		28 June 1941	15 January 1942	9 April 1943	
Fencer (D64)	Western Pipe & Steel Co., San Francisco, CA	5 September 1941	4 April 1942	20 February 1943	
Hunter (D80)	Ingalls Shipbuilding, Pascagoula, MS	15 May 1941	22 May 1942	11 January 1943	Returned to US ownership, 1945
Pursuer (D73)		31 July 1941	18 July 1942	14 June 1943	Returned to US ownership, 1946
Ravager (D70)	Seattle-Tacoma Shipbuilding Corp., Seattle, WA	11 April 1942	16 July 1942	26 April 1943	
Searcher (D40)		20 February 1942	20 June 1942	8 April 1943	Returned to US ownership, 1945
Stalker (D91)	Western Pipe & Steel Co., San Francisco, CA	6 October 1941	5 March 1942	30 December 1942	
Striker (D12)		15 December 1941	7 May 1942	29 April 1943	Returned to US ownership, 1946
Tracker (D24)	Seattle-Tacoma Shipbuilding Corp., Seattle, WA	3 November 1941	7 March 1942	31 January 1943	Returned to US ownership, 1945

The Ruler-class escort carrier HMS *Rajah*, pictured in late 1943, while conducting sea trials in the Salish Sea on America's west coast, between Canada and the USA. Subsequently, the *Rajah* would serve with the British Eastern Fleet (BEF).

Ruler class

The Ruler-class (sometime called Ameer-class) escort carriers were virtually identical to the ships of the Attacker and Bogue classes. The only real difference was that these ships were laid down and built as carriers rather than being converted from the half-built hulls of Type C3 cargo ships. The same basic plans were used, as by this stage of the war the new production line shipbuilding techniques pioneered in US shipyards were fully operational, and any significant change would delay the speed with which these ships could be produced. The US government was already building 50 Casablanca-class escort carriers, based on a larger Type C4 hull, but despite the Admiralty putting in a bid for some of these larger ships, they had to be content with the smaller Type C3 design, to avoid waiting until 1944 for them to arrive.

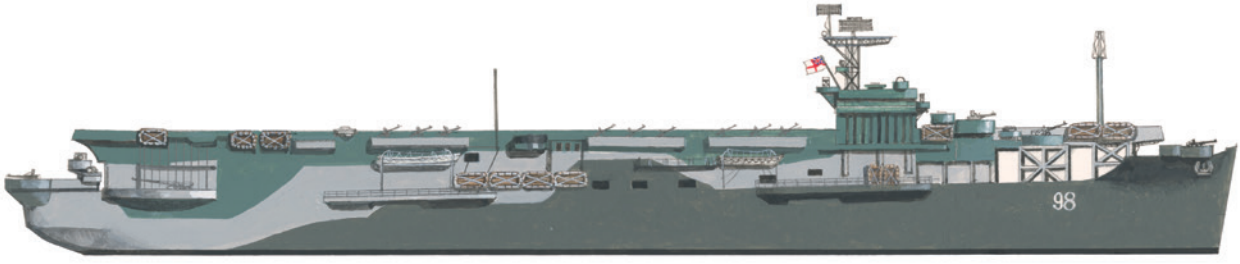
In fact, by this stage the Royal Navy was experiencing serious manning problems. The service was hard-pressed to man the ships it had and to weld together ships' companies made up of pre-war sailors, wartime volunteers, young draftees and veteran seamen transferred from the merchant service. The navy was desperately short of air crews and flight deck crews, and so for this reason a number of American-built escort carriers delivered after

E

RULER CLASS: HMS *EMPEROR* (1944) AND HMS *SHAH* (1944)

The Ruler class were essentially US Bogue-class escort carriers, the only real difference being that rather than being converted from merchant ships, they were laid down as warships. All 23 ships of this class were built in Seattle, and then transferred to the Royal Navy from late 1943 onwards. Of the two Ruler-class carriers shown here, HMS *Emperor* entered British service in August 1943, while HMS *Shah* joined her the following month. After further modifications to conform to British requirements, they entered active service in early 1944. *Emperor* was attached to the Home Fleet, and that spring she took part in the Fleet Air Arm's attacks on the German battleship *Tirpitz*. The camouflage scheme shown here was in use throughout that year, even after her redeployment to the Mediterranean in July. At this time her embarked squadron (800 NAS) operated Grumman Hellcats.

After being commissioned, HMS *Shah* was modified in a Canadian shipyard before being sent to join the British Eastern Fleet. She was deployed in the Indian Ocean on trade protection duties and anti-submarine operations, but during the spring of 1945 she saw more active service off the coast of Burma. Until the autumn of 1944 *Shah* sported the camouflage scheme shown here. Later that year she was repainted to conform to the simpler scheme favoured by the British Pacific Fleet. Pictured is a Grumman Avenger belonging to her embarked squadron, 851 NAS.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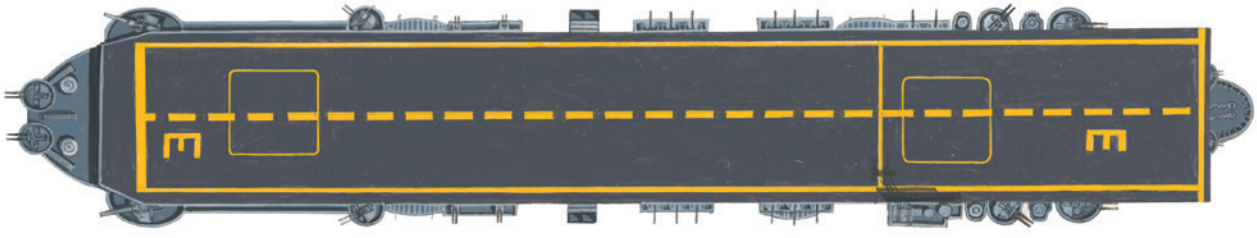
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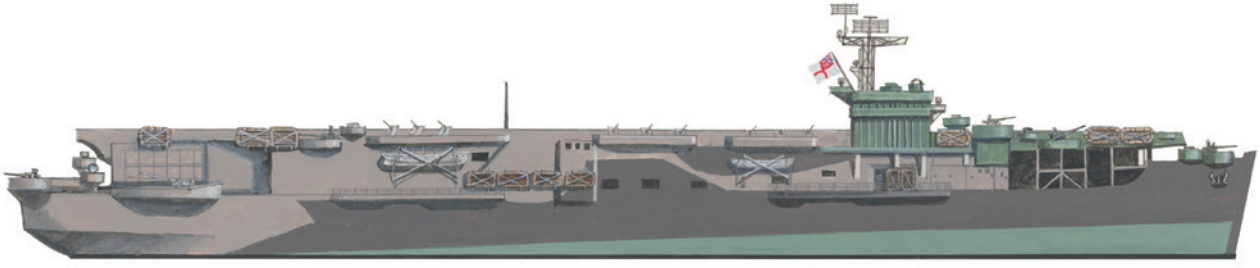


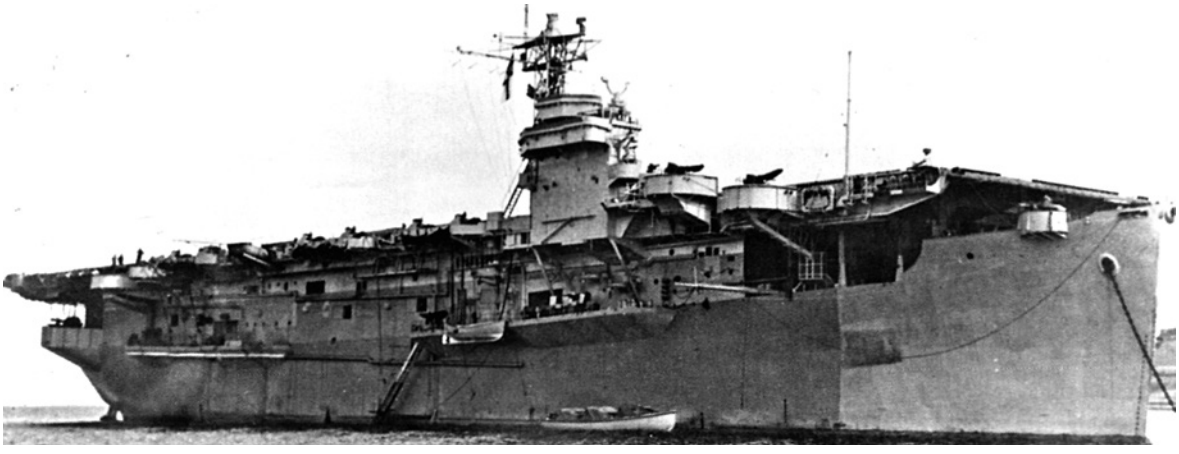
HMS *Nabob*, a Ruler-class escort carrier, pictured in April from one of her aircraft while a Wildcat of 852 Squadron FAA lands on her deck. At the time, the carrier was engaged in operations against German shipping in Norwegian waters.

the summer of 1943 were used as aircraft ferries rather than as fully operational carriers. This problem continued throughout the last years of the war.

The other problem was the long time lag between commissioning an American-built escort carrier and it becoming operational. Part of this was due to delays in the United States, as the ships were prepared for service, and while a crew was found to man them. The modification of the ships in Britain or Canada, followed by an extensive 'working up' period, meant that in many cases a new carrier would take three months to become fully operational. The US government complained about this delay, but the Admiralty were unwilling to send their ships into danger before they were fully ready. When these new Ruler-class ships did enter service, though, both their new crews and the Admiralty were delighted with them.

Although very similar to the Attacker class, these new escort carriers incorporated a few minor changes. They had a more powerful catapult, needed to launch the new and heavier US-built aircraft then entering service, but this was not suitable for British-built aircraft, although these could still be launched without the assistance of a catapult. The wooden flight deck was slightly longer and narrower than that of the Attacker class, but for all practical purposes this made no difference to aircraft operation. These ships also came equipped with US Navy surface search and air search radars, which had plan position indicator (PPI) screens like a modern radar set, rather than the pulse type used by the Royal Navy at the time. This led directly to the adoption of PPI screens on British warships during the last years of the war.

Ruler class (also known as Ameer class)	
Ships in class: 23: *Ameer*, *Arbiter*, *Atheling*, *Begum*, *Emperor*, *Empress*, *Khedive*, *Nabob*, *Patroller*, *Premier*, *Puncher*, *Queen*, *Rajah*, *Ranee*, *Reaper*, *Ruler*, *Shah*, *Slinger*, *Smiter*, *Speaker*, *Thane*, *Trumpeter*, *Trouncer*	
Displacement	15,390 tons (deep load)
Dimensions	Length: 492ft Beam: 108ft 6in. Draught: 25ft 5in.
Propulsion	Single shaft, 1 Allis-Chalmers geared turbine, 2 Foster Wheeler boilers, generating 8,500bhp
Maximum speed	18 knots (*Trumpeter*: 18.5 knots)
Fuel capacity	3,290 tons (fuel oil) (*Trumpeter*: 3,196 tons [fuel oil])
Range	27,500 miles at 11 knots
Armament	2 x single US 5in. Mark 9 guns, 8 x twin 40mm Bofors, 14 x twin 20mm Oerlikons, 7–11 single 20mm Oerlikons (quantity varied from ship to ship)
Sensors	US Navy SG SS and SK (AS) radars, British Type 79 AS, Type 271 SS radars
Flight deck	450ft (*Trumpeter*: 442ft) x 80ft wood over steel plate
Catapult	One (hydraulic): 8 ton capacity
Hangar	260ft x 62ft x 18ft, two lifts (one forward, one aft)
Aviation fuel capacity	44,800 gallons (*Trumpeter* 44,600 gallons)
Aircraft	Up to 30
Complement	646



In early 1945, the Ruler-class escort carrier HMS *Speaker* was sent to serve in the Pacific theatre. In this photograph, taken off Sydney that February, she wears the colour scheme favoured by the British Pacific Fleet. She later saw action off Okinawa and in the Leyte Gulf.

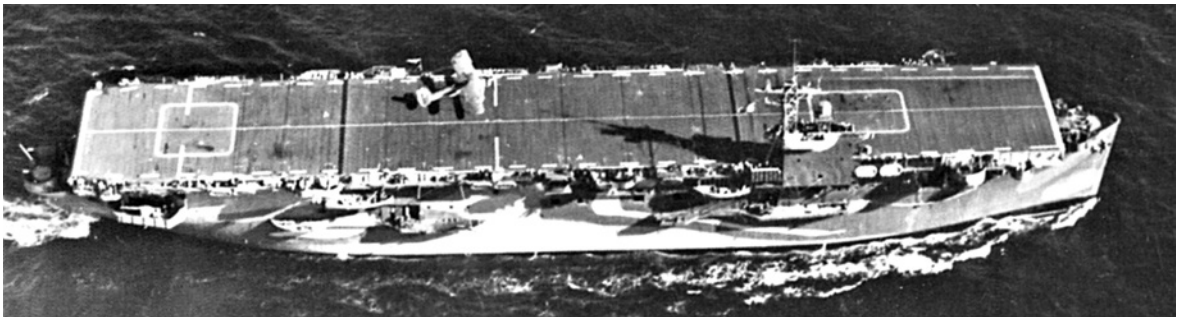
Not everything, however, was to the Royal Navy's liking. Like the Attacker class, the hangar deck sloped upwards at the bow and stern, and this made aircraft handling difficult, especially in rough weather. The lifts were awkward too, and some of the larger aircraft, such as the Swordfish or the Avenger, could only be brought up by turning them diagonally on the lift. This slowed down the process of preparing an aircraft for operation, or of striking it back down into the hangar afterwards. As was the case with other US-built ships, the British reduced their aviation fuel bunkerage to conform to their own more stringent safety requirements.

Unlike on the Attacker class, most of these Ruler class ships retained the US 5in. guns that had originally been installed in them, although in some cases they were replaced by British 4in. DP guns. The anti-aircraft battery was larger than on the ships of the preceding class, as twin 40mm anti-aircraft guns were mounted in addition to single 20mm Oerlikons. The lessons of the fighting in both the Mediterranean and Pacific underlined the importance of

HMS *Begum*, a Ruler-class escort carrier, pictured in mid-1944 while serving with the BEF, conducting anti-submarine operations in the Indian Ocean. Ranged on her deck are Avengers and Wildcats of 832 Squadron FAA.

this added close-range firepower. However, the exact number of these small-calibre guns varied slightly from ship to ship. Generally, though, ships sent out to the Pacific had their anti-aircraft armament augmented by replacing some 20mm mountings with 40mm ones. It was generally acknowledged that these Ruler-class escort carriers were the best of their kind, and so represented the apogee of the British escort carrier during the war.

Ruler class (23 ships in class)					
Vessel	**Original Builder**	**Laid Down**	**Launched**	**Completed**	**Fate**
Ameer (D01)	Seattle-Tacoma Shipbuilding Corp., Seattle, WA	18 July 1942	18 October 1942	20 July 1943	Returned to US ownership, 1946
Arbiter (D31)		26 April 1943	9 September 1943	31 December 1943	
Atheling (D51)		9 June 1942	7 September 1942	1 August 1943	
Begum (D38)		3 August 1942	11 November 1942	3 August 1943	
Emperor (D98)		23 June 1942	7 October 1942	6 August 1943	
Empress (D42)		9 September 1942	30 December 1942	13 August 1943	
Khedive (D62)		22 September 1942	27 December 1942	23 August 1943	
Nabob (D77)		20 October 1942	9 March 1943	7 September 1943	Constructive loss, 22 August 1944
Patroller (D07)		27 November 1942	6 May 1943	25 October 1943	Returned to US ownership, 1946
Premier (D23)		31 October 1942	22 March 1943	3 November 1943	
Puncher (D79)		21 May 1943	8 November 1943	5 February 1944	
Queen (D19)		12 March 1943	31 July 1943	7 December 1943	
Rajah (D10)		17 December 1942	18 May 1943	17 January 1944	
Ranee (D03)		5 January 1943	26 June 1943	8 November 1943	
Reaper (D82)		5 June 1943	22 November 1943	21 February 1944	
Ruler (D72)		25 March 1943	21 August 1943	22 December 1943	
Shah (D21)		13 November 1942	21 April 1943	27 September 1943	Returned to US ownership, 1945
Slinger (D26)		25 May 1942	15 December 1942	11 August 1943	Returned to US ownership, 1946
Smiter (D55)		10 May 1943	27 September 1943	20 January 1944	
Speaker (D90)		9 October 1942	20 February 1943	20 November 1943	
Thane (D48)		23 February 1943	15 July 1943	19 November 1943	Constructive loss, 15 January 1945
Trouncer (D85)		1 February 1943	16 June 1943	31 January 1944	Returned to US ownership, 1946
Trumpeter (D09)		25 August 1942	15 December 1942	4 August 1943	



This photograph of HMS *Attacker* was taken in early 1943, while the escort carrier was conducting flying trials off Norfolk, Virginia. *Attacker* underwent further modification in Liverpool before sailing for the Mediterranean, where she flew missions in support of the Allied landings at Salerno and the South of France.

OPERATIONAL HISTORY

Audacity class

Audacity: Employed on convoy protection between Gibraltar and home waters. Sunk by torpedoes from *U-751*, 20 December 1941.

Archer class

Archer: Operational deployment delayed until 1942 due to engine problems and accidents. Employed on escort duties in South Atlantic in 1942, before participating in the Allied landings in North Africa (Operation *Torch*) in November that year. Subsequently on anti-submarine duty in Atlantic, until August 1943, when she was laid up due to engine problems. Decommissioned March 1945.

Avenger: Used for Deck Landing Trials (DLT) in summer 1942. Participated in Operation *Torch* that November. Sunk by torpedoes from *U-155*, 15 December 1942.

Biter: Employed on convoy escort duties throughout her wartime career, apart from November 1942, when she participated in Operation *Torch*. After the war transferred to France and was renamed *Dixmunde*.

Dasher: Took part in Operation *Torch*, then operated on convoy escort duties in the Atlantic. Sunk in the Clyde following an explosion during aircraft refuelling, 27 March 1943.

Activity class

Activity: Used for DLT during 1943, then employed on convoy escort duties in the Atlantic and Arctic. Sent to the Pacific in 1945, ferrying replacement aircraft.

Pretoria Castle class

Pretoria Castle: Used as a training carrier and aircraft trials ship.

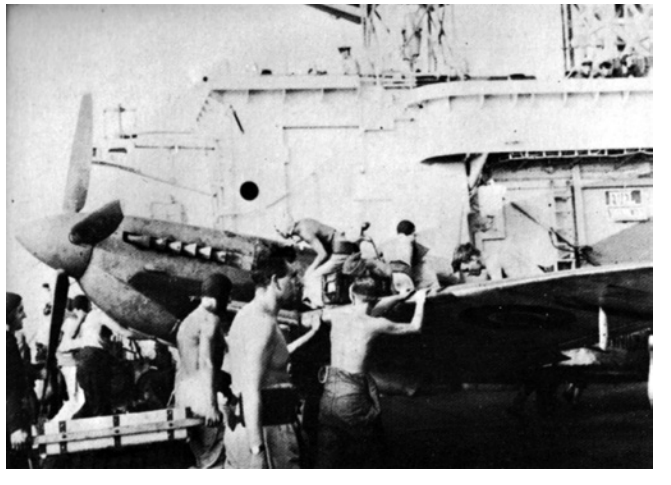
Nairana class

Campania: Principally employed in support of Arctic convoys, while occasionally serving in a U-boat hunting group in the same waters.

Nairana: During 1944 deployed in a U-boat hunting group in North Atlantic. Subsequently supported Arctic convoy operations.

Vindex: Employed on convoy protection duties in North Atlantic and Arctic, while occasionally serving in a U-boat hunting group in Arctic waters.

A Fairey Seafire of 834 Squadron FAA embarked on the Attacker-class escort carrier HMS *Battler* after her landing, being manhandled aft towards the lift. From late 1943 until late 1944 she served with the British Eastern Fleet, performing convoy protection duties in the Indian Ocean.



ABOVE LEFT
A Grumman Wildcat of 882 Squadron FAA being readied for take-off from the Attacker-class escort carrier HMS *Pursuer* in early 1944. At that time *Pursuer* was operating with the Home Fleet, conducting attacks on enemy shipping in Norwegian waters.

ABOVE RIGHT
The hangar of the Attacker-class escort carrier HMS *Ravager*. The photograph was taken in early 1945, while she was serving as a training carrier. This accounts for the unusual mixture of aircraft – Hellcats, Avengers and Barracudas.

Attacker class

Attacker: Spent most of her wartime career in the Mediterranean. Supported Allied landings at Salerno and in Southern France. In September 1944 she was sent to join the British Pacific Fleet (BPF).

Battler: Served on convoy protection duties on the Gibraltar route for much of 1943, before supporting the Allied landing at Salerno. Transferred to the Indian Ocean in October and subsequently served with the BPF.

Chaser: First carrier to embark an Avenger squadron, May 1943. Principally employed in support of Arctic convoys until spring 1944, when she was converted into a ferry carrier. Subsequently served in that capacity with the BPF.

Fencer: Attached to the Home Fleet, and saw action off the Azores in October 1943 and during the air attacks on *Tirpitz* in northern Norway the following spring. Also carried out convoy protection duties in the Atlantic, as well as in Arctic and West African waters. Transferred to the BPF in 1945.

Hunter: Supported Allied landings at Salerno and in Southern France during 1943–44, then participated in naval operations in the Aegean. From 1945 she served with the British East Indies Fleet (BEIF).

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THE SINKING OF HMS *AVENGER*, NOVEMBER 1942

In the autumn of 1942, the Attacker-class escort carrier HMS *Avenger* joined the Home Fleet and embarked her aircraft – three Swordfish of 825 Squadron and 12 Sea Hurricanes of 802 and 883 squadrons. *Avenger* provided an escort to two Arctic convoys, during which her fighters shot down several German aircraft and her Swordfish detected six U-boats, one of which was sunk. Then, in late October, she was ordered south to take part in Operation *Torch*, the Allied landings in North Africa. *Avenger* provided fighter cover for the landings near Algiers before returning to Gibraltar to escort a homeward-bound convoy, MKF 1Y. Early on 15 November, when the convoy was 125 miles west of Gibraltar, it was spotted by *U-155*. At 4.14am, Kapitänleutnant Adolf Piening fired four torpedoes at the convoy before being forced to dive by a British destroyer. One torpedo hit the troop transport MV *Ettrick*, another the transport USS *Almaak*, while a third struck *Avenger* on her port side.

This single torpedo detonated amidships in *Avenger*, causing a huge explosion. The carrier was then shrouded in smoke, and when it cleared the *Avenger* had disappeared. Other witnesses claim she virtually disintegrated. It appears the detonation ignited the ordnance in the carrier's bomb room, and the resulting explosion tore the central portion of the ship apart. It almost certainly also ignited the ship's store of aviation fuel, which added to the scale of the catastrophe. Of her crew of 528 men, there were only 12 survivors. This scene depicts the moment when the torpedo struck the *Avenger*, a second or two before the ship was ripped to pieces by a huge internal explosion. Piening and his boat sank 140,000 tons of Allied shipping during the war, and while *U-155* was scuttled in 1945, Piening survived the war.

HMS *Ameer*, a Ruler-class escort carrier, pictured in early 1945, with Grumman Hellcats of 804 Squadron FAA embarked. At the time she was serving with the British Eastern Fleet, and her aircraft were supporting amphibious operations off the coast of Burma.

BELOW LEFT
On the flight deck of the Ruler-class escort carrier HMS *Empress*, Hellcat pilots of 800 and 804 squadrons FAA study a relief map of the Kaafjord, the lair of the German battleship *Tirpitz*. During Operation *Tungsten*, their aircraft would strafe the battleship's decks with machine-gun fire.

BELOW RIGHT
On 22 August 1944, the Ruler-class escort carrier HMS *Nabob* was torpedoed while operating off the Norwegian coast. She remained afloat, though, and limped back to Scapa Flow, listing badly and down by the stern.

Pursuer: Served on convoy protection duties in the Atlantic until March 1944, when she joined the Home Fleet. Involved in FAA attacks on *Tirpitz* off northern Norway, before operating in the English Channel during D-Day landings. Supported Allied landings in southern France and naval operations in the Aegean before re-joining the Home Fleet in October 1944. Carried out attacks on shipping in Norwegian waters, and in mid-1945 she joined the BEIF.

Ravager: Employed as a training carrier.

Searcher: Served on convoy protection duties in the Atlantic until March 1944, when she joined the Home Fleet. Thereafter her career mirrored that of *Pursuer*.

Striker: Served on convoy protection duties covering Atlantic and Arctic convoys, and conducted attacks on enemy shipping off Norway. Subsequently served with a U-boat hunting group in Arctic waters until October 1944, when she was sent as a ferry carrier attached to the BFP.

Tracker: Served on convoy protection duties covering Atlantic and Arctic convoys throughout the war.

Ruler class

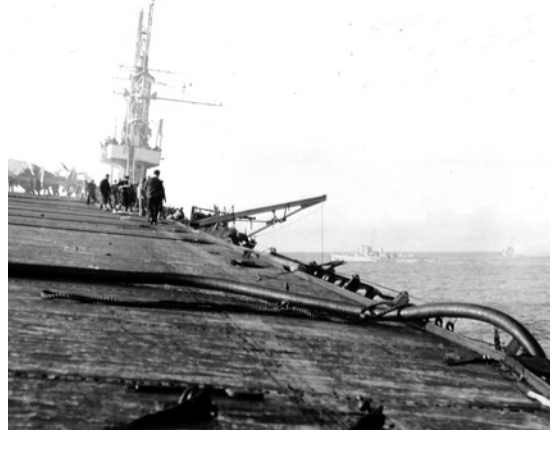
Ameer: Attached to British Eastern Fleet (BEF), serving as a trade protection carrier. In early 1945 participated in operations off coast of Burma and Malaya, and the reoccupation of Singapore.

Arbiter: Served in the BEF as a ferry carrier.

Atheling: Attached to BEF throughout war, serving primarily in convoy protection duties in the Indian Ocean. From October 1944 served as a ferry carrier.

Begum: Served with BEF in anti-submarine warfare (ASW) operations in Indian Ocean. Returned to UK in early 1945 for conversion into a ferry carrier, and subsequently served with the BPF.

Emperor: Attached to the Home Fleet and engaged in operations in Norwegian waters, including attacks on *Tirpitz* in northern Norway. Operated in the English Channel during D-Day landings, then attached to the Mediterranean Fleet. Supported Allied landings in southern France and naval operations



in the Aegean before joining BEIF in spring 1945. Participated in operations off Nicobar Islands and reoccupation of Singapore.

Empress: Spent several months undergoing defect repairs in UK before joining BEF in early 1945. Participated in operations off the coast of Burma and Nicobar Islands, and the reoccupation of Singapore.

Khedive: Crewed mainly by Royal Canadian Navy personnel. Supported Allied landings in Southern France and naval operations in the Aegean before joining BEIF in early 1945. Participated in the reoccupation of Penang and Singapore.

One of the tasks that was often given to escort carriers was the transport of aircraft. Here, the snow-covered flight deck of HMS *Ruler* is filled with FAA Hellcat and Firefly fighters, bound for the British Pacific Fleet. *Ruler* sailed for the Far East in late January 1945.

Nabob: Crewed mainly by Royal Canadian Navy personnel. Attached to Home Fleet and participated in air operations against *Tirpitz*. On 22 August she was torpedoed by *U-354*, but managed to return to Scapa Flow. She was then decommissioned as a 'constructive loss'.

Patroller: Served in the BEF as a ferry carrier.

Premier: Employed as a transatlantic ferry carrier until September 1944, when transferred to the Home Fleet. Subsequently participated in anti-shipping and minelaying operations in Norwegian waters until early 1945. She operated in support of an Arctic convoy, then was employed as a DLT carrier in the Clyde.

Puncher: Operated as a ferry carrier until early 1945, when she joined the Home Fleet. Subsequently participated in anti-shipping and minelaying operations in Norwegian waters until June 1945, when she was employed as a transatlantic troop transport.

Queen: Employed as a transatlantic ferry carrier until early 1945, when she joined the Home Fleet. Subsequently participated in anti-shipping and minelaying operations in Norwegian waters until May 1945, when she supported an Arctic convoy, before transferring troops to the Pacific theatre.

Rajah: Operated as a DLT carrier in the Clyde before joining the BEF in late 1944. Subsequently employed as a ferry carrier and troopship.

Ranee: Employed as a transatlantic ferry carrier until June 1945, when she transferred troops to the Pacific theatre.

Reaper: Served on protection duty for Gibraltar and Atlantic convoys. Damaged in a collision in December 1944, and after being repaired she was used as a ferry carrier, attached to the BPF.

Ruler: Employed as a transatlantic ferry carrier until January 1945, when she was transferred to the BEF as a replenishment carrier. Subsequently operated off Okinawa with the BPF, and was present at the Japanese surrender in Tokyo Bay in September 1945.

HMS *Slinger*, pictured in November 1944, turning into the wind in the Clyde Estuary before launching Seafires of 768 Squadron FAA. At the time she was being used by trainee pilots to practice deck landings.

The MV *Adula* was an oil tanker belonging to the Royal Dutch/Shell Line. She was converted into a MAC ship in Falmouth, and took up operational duties in early 1944. She protected Atlantic convoys for the remainder of the war, after which she was converted back into a tanker.

Shah: Attached to the BEF and employed on trade protection and ASW duties in the Indian Ocean. In April she participated in operations off the Nicobar and Adaman Islands, and in the pursuit of the Japanese cruiser *Haguro*.
Slinger: In February 1944 struck a mine in River Medway, and repairs lasted until October. Subsequently served as a deck landing training (DLT) carrier until January 1945, when sent to join the BPF as a replenishment carrier.
Smiter: Employed as a transatlantic ferry carrier until July 1945, when she was transferred to the BEIF, but without an air group embarked. Subsequently used to repatriate former POWs.
Speaker: Converted into an assault carrier in the spring of 1944, then operated as a DLT carrier in the Clyde. Sent to join the BPF in early 1945 and participated in invasion of Okinawa and operations off Leyte Gulf. Subsequently employed as a replenishment carrier and ferry carrier before transporting Commonwealth former POWs to Australia and UK.
Thane: Operated as a transatlantic ferry carrier. Torpedoed by *U-482* off the Clyde estuary, but limped into Faslane. Subsequently decommissioned as a 'constructive loss'.
Trouncer: Operated as a ferry carrier between US, UK and Gibraltar until the end of the war.
Trumpeter: Served as a ferry carrier until June 1944, when attached to Home Fleet. Participated in attacks on shipping in Norwegian waters, including *Tirpitz* (August 1944). Involved in liberation of Copenhagen. In July 1945 sent to join the BEF.

MAC Ships

All 17 British-flagged MAC ships, as well as the two Dutch-flagged ones, operated in support of the Atlantic convoys until May 1945, when they were restored to their original configuration as either grain ships or tankers.

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HMS *NABOB* DURING OPERATION *GOODWOOD*, AUGUST 1944

By the summer of 1944, the German battleship *Tirpitz* had spent more than two years in Norwegian waters, where she was well placed to menace the safe operation of the Arctic convoys. The previous September she had been damaged during an attack by British midget submarines, but she still represented a serious threat, so her destruction remained a priority to the British Admiralty. In August 1944, the Home Fleet staged a series of air attacks on the *Tirpitz* as she lay in her anchorage in the Altenfjord, near the northernmost tip of Norway. Codenamed Operation *Goodwood*, this involved a series of naval air strikes launched from three fleet and two escort carriers. One of these was the *Nabob*, a Ruler-class escort carrier. Unlike the other escort carriers, *Trumpeter* and *Empress*, she did not take part in these attacks. Instead, her job was to provide anti-submarine protection for the task force.

This scene depicts *Nabob* as she appeared during the morning of 22 August. While strike aircraft and fighter escorts from *Formidable*, *Furious*, *Indefatigable* and *Trumpeter* can be seen assembling in the sky overhead, on the flight deck of *Nabob* a flight of four Grumman Avengers from 852 Squadron Fleet Air Arm are taking off, at the start of their anti-submarine patrol. Further aft on her flight deck are four more Avengers and two of the escort carrier's four Grumman Wildcat fighters, also from 852 Squadron. Ironically, that evening *Nabob* was struck by a torpedo fired by *U-354*, badly damaging her and causing 21 fatalities. *Nabob* survived, but saw no further active service.

The Fairey Swordfish, popularly known as 'The Stringbag', first entered service in 1936, and despite attempts to replace them, these aircraft proved so useful that they remained in FAA service until the end of the war. Their low take-off speed and ability to carry depth charges made them perfectly suited for service on board both MAC ships and escort carriers.

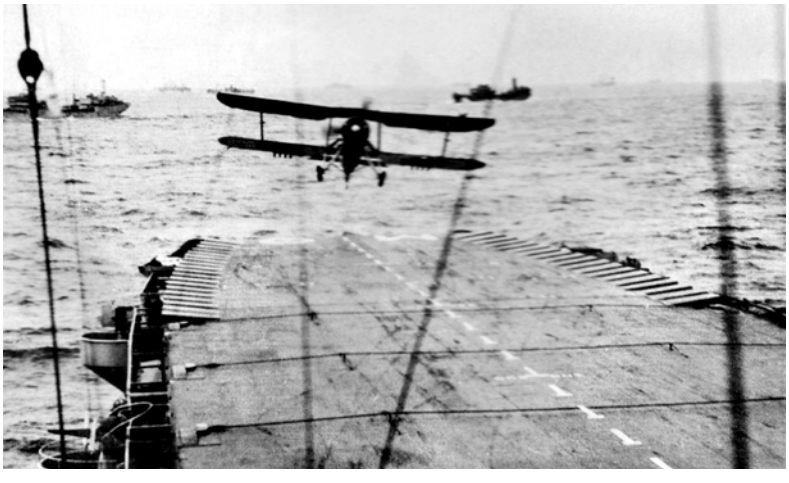
AIRCRAFT

Operating aircraft from escort carriers was a challenge due to these vessels' relatively small size and lack of speed. Despite this, an impressive range of aircraft operated from them during the war. Some British-built escort carriers (*Audacity*, *Activity* and the Nairana class) lacked a catapult, so aircraft had to perform unassisted take-offs, helped only by the carrier's speed (14–18 knots), plus the speed of the wind over the flight deck. MAC ships were even slower, which is why they were limited to using the Swordfish, which had a sufficiently low take-off speed – little more than a fast walking speed. Carriers always turned into the wind to launch, in order to increase the wind speed over the flight deck to help aircraft generate lift. Generally speaking, a sufficient launch speed was attainable for most wartime aircraft, but the catapult made taking off less tricky, especially for larger and heavier aircraft.

Even then the catapult was not perfect: on the Attacker class, the US-built catapult used a tail-down method of launch, which did not work with British-built aircraft. So, while Hellcats and Avengers were fine, embarked Seafires or Swordfish still had to perform unassisted take-offs. In any case, launching by catapult was a slow process, and more commonly all the aircraft would be launched without using the catapult. This was especially the case when a large number were to be launched, for example when forming part of a large air formation. Then, aircraft could be launched roughly 15 seconds apart. Typically, a convoy or force commander would decide whether the whole force would turn with the carrier, or just the carrier itself. Aircraft were ranged on the after deck with their engines warmed up. Once crewed, the engines were started and everyone waited for the signal from the bridge, which indicated a take-off could commence. Usually, aircraft were launched in sub-flights of three aircraft, but this varied depending on the number of aircraft taking part in the mission.

An escort carrier would also turn into the wind for aircraft recovery, to help reduce the landing speed of the aircraft. A series of arrester wires spanning the after end of the flight deck were designed to catch the landing hook of the aircraft and bring it to a halt. If for some reason the aircraft wasn't snagged by an arrester wire, then it would – in theory – be caught by a safety barrier, which resembled an over-sized tennis net. While landing, a deck landing control officer (or batsman) would guide the aircraft down with a pair of hand-held paddles. Signals covered going higher, lower, port or starboard, or reduce

A Swordfish landing on the deck of the MAC ship MV *Adula* during flying operations in support of an Atlantic convoy in 1944. Note that the MAC ship is steaming away from the convoy, having turned into the wind in order to land her aircraft.



speed, as well as correct approach. He could also tell the pilot to go round again. Once the aircraft was about to land, the batsman would cross his bats, signalling to the pilot to throttle back and land. The safety net was raised for each landing, and then lowered to allow the aircraft to be manhandled forward of it. It would then be raised again, ready for the next landing.

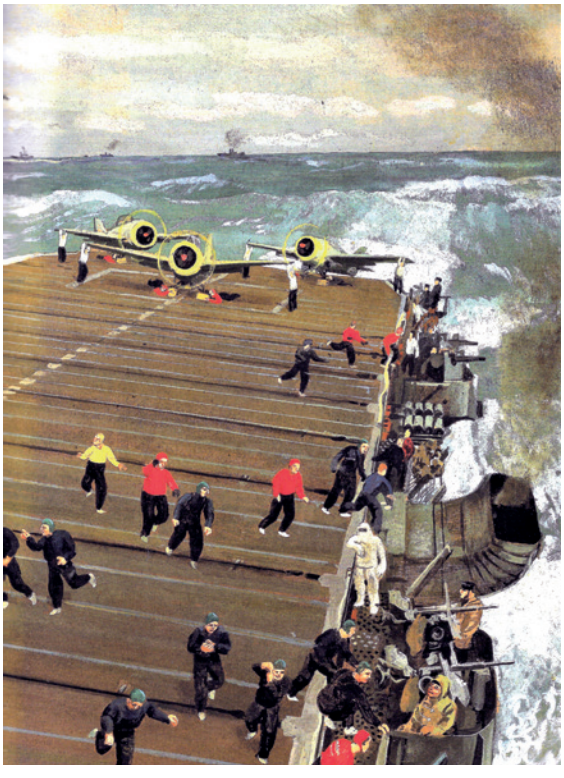
As for the aircraft themselves, the most famous was the Fairey Swordfish. When the war began, this biplane was the Fleet Air Arm's main striking force, and despite attempts to replace it, the Swordfish remained in service throughout the war. Its slow take-off speed made it ideal for operations from escort carriers, and it was the only aircraft type capable of operating from the tiny flight decks of MAC ships. It had an open cockpit, and its three-man crew (pilot, observer/bomber and telegraphist/gunner) had to be well-clad for a lengthy mission. Later versions had stronger airframes, internal communications and an effective radar. With an enlarged tank, it had a range of 900 nautical miles, and could carry four depth charges, three 500lb bombs or a 21in. torpedo. Their slow speeds of about 100mph when laden worked to their advantage when loitering ahead of a convoy, looking out for U-boats.

A former oil tanker owned by the Royal Dutch/Shell Line, the MV *Amastra* was converted into a MAC ship in the summer of 1943. She lacked a hangar, so her complement of four Swordfish were kept on her flight deck.

From February 1944 on, the Grumman Avenger began to be deployed on escort carriers. Despite Admiralty attempts to call it the 'Tarpon', the more robust American name was used throughout the war, as was the case with the Grumman Hellcat (or 'Gannet' to the Admiralty). Like the Swordfish, the Avenger was classed as a TBR (torpedo-bomber-reconnaissance aircraft), but with a maximum speed of 232 knots and a range of 2,200 miles with drop tanks, it was in a different league from the older biplane. It also had a three-man crew and could carry a 21in. torpedo, two 1,000lb bombs or one 2,000lb one. Less effective was another TBR, the British-built Fairey Barracuda. Designed as a replacement for the Swordfish, it had a top speed of 150mph and a range with extra tanks of 1,000 miles. However, it struggled to take off from escort carriers, so was only deployed operationally on one escort carrier.

When it came to fighters, the British did what they could with naval versions of the Hawker Hurricane and Supermarine Spitfire. The Sea Hurricane lacked folding wings, but with a speed of up to 268 knots and a range of 482 miles it was a useful fighter when it came to flying Combat Air Patrol (CAP) missions over a convoy or naval group. Sea Hurricanes were deployed on board CAM ships from mid-1941 on, and on escort carriers from late 1942. With a top speed of 252 knots, the Supermarine Seafire was faster and its range could be extended to 600 miles with drop tanks. It also had folding wings, making it better suited to use on board carriers, and it could also

A Grumman Avenger of 846 Squadron FAA, pictured taking off from HMS *Trumpeter* during operations off the coast of Norway in August 1944. Although designed as a torpedo bomber, the Avenger could also be equipped with bombs or rockets, making it a useful anti-submarine aircraft.



In this painting by war artist Stephen Bone, the flight deck crew clear the deck before a sub-flight of Grumman Wildcats take off in support of an Atlantic convoy. Note the colour-coded attire of the flight deck crew.

carry three 500lb bombs. It had its disadvantages, though – it was less robust than the Sea Hurricane and tended to 'bounce' on landing.

The FAA also used the Fairey Fulmar, a larger and more lumbering two-man fighter, with a top speed of 272mph and a range of 680 miles. Like the Barracuda it was difficult to operate from an escort carrier, so was only embarked on *Biter* and *Campania*. The same problem also limited the suitability of its successor, the Fairey Firefly. It had a top speed of 316mph and a range of 1,130 miles, which in theory would have made this two-man fighter a suitable replacement for the Fulmar, if other better American-built aircraft had not been available. Still, the Firefly could carry two 500lb bombs or, like most British fighters, rockets. However, it was lumbering and difficult to use from smaller flight decks, so this aircraft was only deployed on *Premier* and *Searcher*, and then only during the last months of the war.

Much better were the two American-built fighters that saw extensive service on escort carriers. The Grumman Wildcat (officially called the 'Martlet' by the FAA until January 1944) was small, manoeuvrable and well-armed. The Martlet was first deployed on *Audacity* in September 1941, and remained in British use throughout the war. With a top speed of 331mph and a range of 845 miles, its good armoured protection made it a formidable opponent. Veteran naval pilot Eric 'Winkle' Brown, who scored his first 'kills' in the aircraft, said after the war: 'I would still assess the Wildcat as the outstanding naval fighter of the early years of World War II.' From December 1943, the Grumman Hellcat became available for deployment on escort carriers. The powerful Hellcat had a maximum speed of 330mph and a range of 1,340 miles with a drop tank, and could carry two 1,000lb bombs. It was regarded as an excellent all-round naval aircraft.

The American-built Grumman F6F Hellcat entered service with the Fleet Air Arm in late 1942, where until early 1943 it was known as the Grumman Gannet, to conform with British nomenclature. At various times this fast and agile fighter was embarked on the escort carriers *Ameer*, *Emperor*, *Empress*, *Khedive*, *Pursuer*, *Ruler*, *Shah* and *Speaker*.

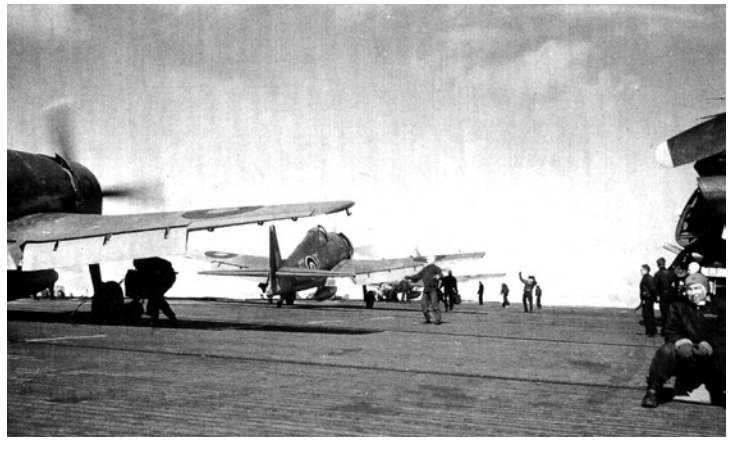
Deployment	
Activity	Swordfish, Wildcat (1943–44)
Ameer	Avenger (1944), Hellcat (1944–45)
Archer	Swordfish, Martlet (1942–43)
Atheling	Seafire (1944)
Audacity	Martlet (1941)
Avenger	Swordfish, Sea Hurricane (1942)
Battler	Swordfish, Seafire (1943–44), Wildcat (1944)
Begum	Avenger, Wildcat (1944–45)
Biter	Fulmar, Sea Hurricane (1942), Swordfish (1942–44), Martlet/Wildcat (1943–44)
Campania	Swordfish, Fulmar, Wildcat (1944–45)
Chaser	Swordfish (1943–44), Sea Hurricane (1943), Wildcat (1944)
Dasher	Sea Hurricane (1942–43), Swordfish (1943)
Emperor	Hellcat (1943–45), Avenger (1945)
Empress	Avenger, Hellcat (1945)
Fencer	Swordfish, Seafire (1943–44), Avenger, Wildcat (1944)
Hunter	Swordfish (1943), Seafire (1943–45)
Khedive	Seafire (1944), Hellcat (1945)
Nabob	Avenger, Wildcat (1944)
Nairana	Swordfish (1943–45), Sea Hurricane (1943–44), Wildcat (1944–45)
Premier	Avenger (1944–45), Wildcat, Firefly (1945)
Puncher	Barracuda (1944–45)
Pursuer	Martlet/Wildcat (1943–45), Hellcat (1945)
Queen	Avenger, Wildcat (1945)
Ruler	Hellcat (1944–45)
Searcher	Martlet/Wildcat (1943–45), Firefly (1945)
Shah	Avenger, Hellcat (1944–45)
Speaker	Hellcat (1944–45)
Stalker	Swordfish (1943), Seafire (1943–45)
Striker	Swordfish, Sea Hurricane (1943–44), Wildcat (1944)
Thane	Avenger (1945)
Tracker	Swordfish, Seafire (1943), Avenger, Wildcat (1944)
Trumpeter	Avenger, Wildcat (1944–45)
Vindex	Swordfish (1943–45), Sea Hurricane (1943–44), Wildcat (1944)

Note: Aircraft being ferried or embarked for training purposes are not listed. Neither are escort carriers that were exclusively used for non-operational duties, such as ferry carriers, replenishment carriers or training carriers. Also, the name Wildcat is used instead of Martlet from 1944 on.

Grumman Hellcats of 804 Squadron FAA are pictured lined up ready for take-off from the Ruler-class escort carrier HMS *Empress*. This photograph was taken during Operation *Tungsten*, when these fighters would attack the German battleship *Tirpitz*.

LIFE ON BOARD

The escort carrier was created due to the necessities of war. It had no real place in a pre-war Royal Navy, and after hostilities ceased most of them were either scrapped or returned to their American owners. Like most of their naval crew, they were 'hostilities only' ships, remaining in service until their wartime task was done. Many were by necessity a hasty conversion from a merchant ship, or else built using new and largely untested prefabricated



A Grumman Wildcat of 811 Squadron FAA pictured in February 1944, landing back on HMS *Biter* after shooting down a German four-engined Junkers 290 bomber, which had just made an unsuccessful glider bomb attack on a British escort group operating in the Western Approaches.

construction techniques. It is little wonder that old naval hands viewed them with some suspicion. Particularly worrying for some were the thin mercantile-style hull sides, which raised concerns about safety. This evaporated, though, as the crews learned to trust their ships. In some cases, life on board an escort carrier was better than in other British ships, despite the tough and relentless duty many crews faced while operating in support of convoys in Atlantic or Arctic waters.

For a start, wartime rationing was in force, but escort carriers operating between Britain and either US or Canadian ports, or which were supplied from American depots, enjoyed rare wartime luxuries, such as fresh meat, fruit, vegetables and dairy products. Ships leaving American ports had refrigerators crammed with provisions that simply weren't available in wartime Britain. Still, the quantity and quality of food was not up to US or Canadian standards, and basic staples such as potatoes quickly ran out. This was particularly tough on the crews of *Nabob* and *Puncher*, most of whom were Canadian. The Canadians found the food appalling, and a crisis in morale was finally averted when the supply officers of these two ships were allowed to draw a higher Canadian victual allowance.

In the American-built escort carriers, the British crews encountered several welcome innovations. First, their traditional hammocks were replaced by bunk beds, three or four high, and comfortable mattresses protected by a waterproof zipper lining. The American-style toilets were unusual, with open stalls, served by a trough of running sea water. Pranksters occasionally took advantage of this by floating burning paper boats down the trough to singe the anatomy of the unwary. These American-built ships also enjoyed air conditioning, which made service in the Pacific or the Mediterranean a little more bearable. However, it could still be hot below decks, and the crew would sometimes sleep on the open flight deck.

Another American innovation was canteen messing. Traditionally, British sailors ate in their messdecks. Now, though, thanks to the American design of their ships, meals were eaten in purpose-built canteens. Other American luxuries included soda fountains and ice-cream machines, both of which were unheard of in more conventional British ships, and which proved extremely popular. Even items of uniform had an American quality to them – most Lend-Lease escort carriers were delivered fully equipped with US-style steel helmets and lifejackets, both of which were considered superior to their British counterparts.

The Sea Hurricane was merely the standard fighter equipped with an arrester hook for carrier landings, and a slightly reinforced undercarriage. Although it proved a versatile fighter and reconnaissance aircraft, and was used by both MAC ships and escort carriers, the inability to fold its wings made it awkward to store on board ship.

Service on board a MAC ship was strange for many embarked Fleet Air Arm crew, as the ships operated as part of the Merchant Navy. While that meant better food, strict mercantile trade union rules

applied, so air crews flying on dawn patrols couldn't be fed breakfast before they left. That was eventually circumvented by the naval crew cooking their own breakfast on a primus stove. As compensation they all got a bottle of beer a day, as they were entitled to it along with the rest of the crew. They also enjoyed slightly higher standards of accommodation. The embarked crews on MAC ships tended to get along well with their merchant seamen counterparts, as both groups understood the importance of their role in convoy defence. In fact, some embarked aircrew even took to painting Merchant Navy rather than Royal Navy on their aircraft, much to the chagrin of senior officers when the aircraft flew back to its base in Northern Ireland or Nova Scotia after a crossing.

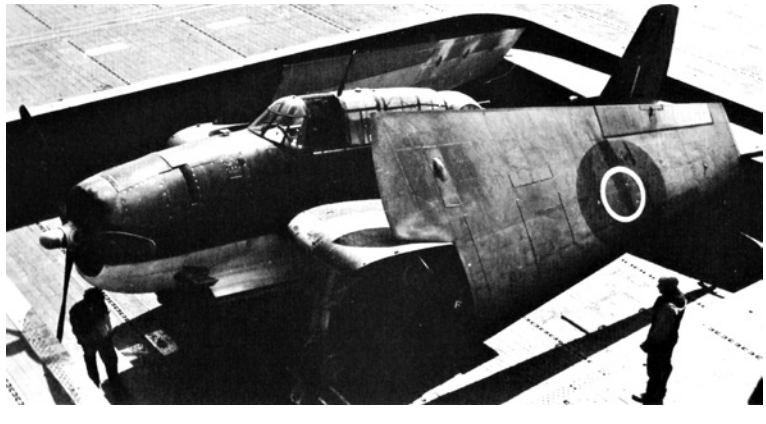
Before a mission, air crews would muster in the ship's briefing room to make sure everyone understood what was expected of them, and to receive final instructions and intelligence reports. This was the briefing room of the Archer-class escort carrier HMS *Biter*.

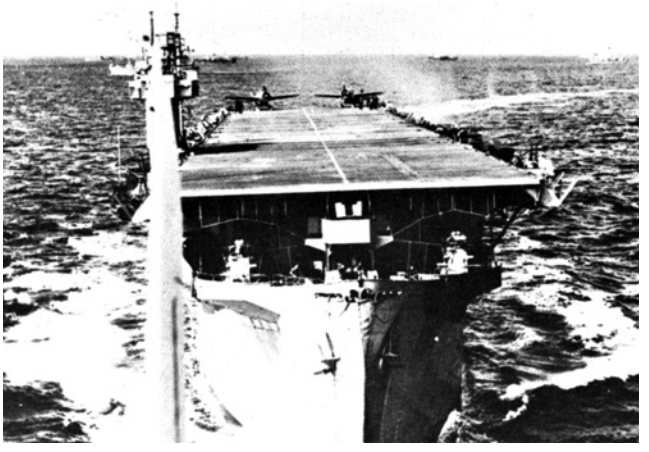
ESCORTS IN ACTION

The escort carrier was nothing if not versatile. While designed and built primarily to protect convoys, these ships soon found other uses: as ferry carriers transporting aircraft, as replenishment carriers providing smaller escort ships with fuel, as transport ships taking troops or even former POWs from one place to another, or as training ships teaching a new generation of naval aviators and maintenance crew their jobs. They were also used to support amphibious landings, or as platforms from which to launch air strikes against enemy shipping or shore targets. They also formed the core of anti-submarine warfare task groups, hunting for enemy U-boats. However, the most common active role given to these ships was the protection of vital convoys, where their aircraft were used as a CAP screen to fend off enemy bombers, or went out searching for U-boats lurking in the path of a convoy.

Aircraft operations from such a small flight deck were often hazardous. On HMS *Audacity*, the aircraft had to be ranged on deck in all conditions, and were often maintained by their mechanics in wind and rain, or at night, using the beam of shaded torches. The results, though, were worth all the trouble. In late October 1941, *Audacity* sailed from the Clyde, in support of the Gibraltar-bound convoy OG-76. On 8 November, when *Audacity*'s radar picked up an aircraft shadowing the convoy from 20 miles astern, two Martlets were sent to intercept. The enemy was a Fw 200 Condor, which was shot down, but so too was one of the Martlets. The carrier's crew had been listening to the pilots over the ship's loudspeaker,

The Ruler class had the advantage of having two lifts, one forward and one aft. In this photograph, a Grumman Avenger with its wings folded has just enough clearance to negotiate the forward lift on board HMS *Queen*.





The Archer-class escort carrier HMS *Biter*, pictured in 1944 from one of her Swordfish, moments after it took off. A pair of Wildcats can be seen ranged on her after flight deck.

and they heard their own aircraft being shot down.

Almost two hours later, another radar contact appeared, and two planes scrambled to intercept. They actually spotted two enemy bombers through a gap in the clouds, and dived to intercept. Sub Lt 'Winkle' Brown swept past one, giving it a one-second burst, then turned around and approached the enemy again. After another burst, the bomber pulled into the clouds. Brown gave chase and was rewarded by another glimpse of his opponent. This time he charged it head-on and fired before pulling out of the way at the last minute. His burst shattered the bomber's windscreen, and it plunged into the sea. As he watched, two of the German crew clambered out and perched on her wing. 'Winkle' Brown had scored his first kill. This and other successes helped demonstrate the value of an escort carrier in convoy protection.

The next example illustrates another kind of mission altogether. In August 1944, HMS *Vindex* was in Arctic waters, supporting the convoy JW-59 bound for Murmansk. On 3 August, *U-344*, commanded by Kapitänleutnant Pietsch, slipped out of her base in Bogen near Narvik, and headed northwards for the Barents Sea. He was after the convoy, and on 20 August he caught up with it. At 6am the following morning he torpedoed the sloop HMS *Kite*, which sank with the loss of 217 of her crew. The following day, though, Pietsch's luck ran out. *Vindex*, in the middle of the convoy, was flying ASW patrols using her 12 embarked Swordfish. These Swordfish were equipped with ASV radar housed in a dome under the fuselage, but the extra weight necessitated reducing the crew to just two men. These Swordfish, armed with either rockets or depth charges, were patrolling around JW-59, and that afternoon Lt Bennett, flying Swordfish 'C', was in the air. His observer, Sub Lt Crouch, spotted a radar contact, and Bennett turned to investigate.

He spotted *U-344* on the surface, approaching the convoy from the south. The U-boat dived, but the Swordfish released a pattern of depth charges around the boat as it submerged. These detonated, and *U-344* sank almost immediately, taking Pietsch and his 50-man crew down with her. Two days later, *Vindex* was involved in the sinking of another U-boat, the *U-354* (although the two losses are sometimes confused), while one of her Sea Hurricanes shot down a shadowing BV-134 flying boat. The 34 merchant ships of Convoy JW-59 reached the Kola Inlet without any further incident. So too did the return convoy, RA-59A, which *Vindex* also escorted. Once again, the presence of an escort carrier played a major part in the safe arrival of the convoy. It also ensured that the loss of HMS *Kite* and her crew was avenged.

The 21in. aerial torpedo carried by a Fairey Swordfish being examined by deck and air crew from HMS *Battler*, prior to a practice flight in the Clyde Estuary during the spring of 1943.

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